

AS-200/S2

Readout Device AS-200/S2 Operating Manual

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Mainz-Kastel, February 2001

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1 General remarks

1.1 Safety information



Before putting the AS-200 or the LD-200 Charger Unit into operation, the operating manual must be read to avoid damage to property or injury to persons.



The AS-200 Readout Device is designed for use in Ex Zone 2 (Temperature Class T4) according to VDE 0165 and this is appropriately confirmed by a manufacturer's declaration from Elster in the appendix. This makes it possible to read in terminal devices which are approved for use in Ex Zone 2 by a manufacturer's declaration or Ex approval. The following conditions must be present before using an AS-200 in Ex Zone 2.

- The removal or replacement of the batteries within Ex Zone 2 is not permissible.
- Connections must only be carried out with the device switched off.
- The plugs on the connecting lead must be screwed at both ends.



The LD-200 Charger Unit is only designed for use with the AS-200 Readout Device. Do not connect it to the AS-100! There is the risk of damaging the AS-100 due to overvoltage!



The LD-200 Charger Unit is only designed for use in dry areas. Therefore, it is essential to protect it from moisture. It should be ensured that the LD-200 receives adequate ventilation.



The LD-200 is supplied with 230 VAC mains voltage. Mains voltage is highly dangerous! Therefore, never open up the unit. Repairs should only be carried out by ELSTER Service.



The LD-200 is only suitable for charging commercially available NiCd rechargeable batteries (Type: Mignon; 2...6 cells; 0.5...0.75 Ah). DO NOT use for dry batteries and non-rechargeable batteries. These may be damaged. There is a risk of explosion!



The batteries contain cadmium and are therefore subject to disposal regulations. Do not throw them away in the usual household refuse. Defective rechargeable batteries can be returned to the manufacturer or ELSTER.

1.2 Changes compared to the previous edition

This operating manual describes the AS-200/S2 Software V8.1. Compared to the issue 02/2000, which described the AS-200/S2 Software from V8.0, the following additions have been made:

- Now parameterisation and reading out of EK260 Volume Correctors is possible.
- Daylight saving time changes are switched off in the ex-works setting (Sections 4.4.8.3 and 4.4.10).
- Parameterisation of the archives (Section 4.6.2.7).
- Cancellation of the readout is possible with the ESC key (Section 4.6.3.1).
- Display of the read data blocks during the readout (Section 4.6.3.1).
- Closing of the user lock after the readout (Section 4.6.3.1).
- Entry of the reading of the mechanical meter (Sections 4.4.5.5 and 4.6.3.2).
- The descriptions of the LIS-200 readout modes have each been supplemented by an illustration of the menu stages (see Sections 4.5.3.1 and 4.6.3.3 to 4.6.3.5).

1.3 Included items and accessories

1.3.1 Included items

The following items are included with the AS-200:

AS-200 Readout Device

4 NiCd rechargeable batteries of 600 mAh capacity (in the AS-200).

Charger Unit LD-200 with connecting lead (only for use with the AS-200).

Optional: Leather case (as transport case).

Operating manual

Readout cable AS/DS.

Optional: IR readout head (only needed if terminal devices in the LIS-200 range are to be read out).

Download software on 3.5" floppy disk (for AWS-100 or under DOS).

Where applicable, update floppy disk for AWS-100 software.

1.3.2 Ordering information

Designation	Order number
Readout device complete with accessories	83480105
Basic device (without accessories)	73014651
AS-200/S2 operating manual in English	73016802
NiCd rechargeable batteries (4 required per AS-200).	04270018
Backup battery, Varta CR 1/2 AA	04270032
AS/DS lead (AS-200 -> terminal device)	73011101
LD-200 complete	73014587
Leather case, separate	73014763
AS/WS lead (AS-200 - AWS-100)	73011101
IR readout head	73015883

2 Brief description

2.1 AS-200/S2 performance features

- Hand-held readout device for mobile data acquisition.
- Automatic detection of LIS-200 Data Loggers DL240, LIS-200 Volume Correctors EKxxx as well as LIS-100 Data Storage Devices DS-100/x and LIS-100 Volume Correctors EK-8x.
- Data transmission according to IEC1107 via infrared interface with LIS-200 devices.
- Setting functions for operating the LIS-200 terminal devices (e.g. Data Logger DL240, Volume Corrector EK260).
- Reading out of the LIS-200 terminal devices (e.g. Data Logger DL240, Volume Corrector EK260) for transmission of archive data to the evaluation station.
- Setting functions for operating the LIS-100 Data Storage Device DS-100/x and the data storage function of the Volume Correctors EK-8x, TC-90, such as for example: Date and time, customer, meter and device numbers, adjustable counter, interval period, pulse value (cp value) and configuration of the DS-100 special functions.
- Reading out of the LIS-100 Data Logger DL240 for transmission of consumption data to the evaluation station.

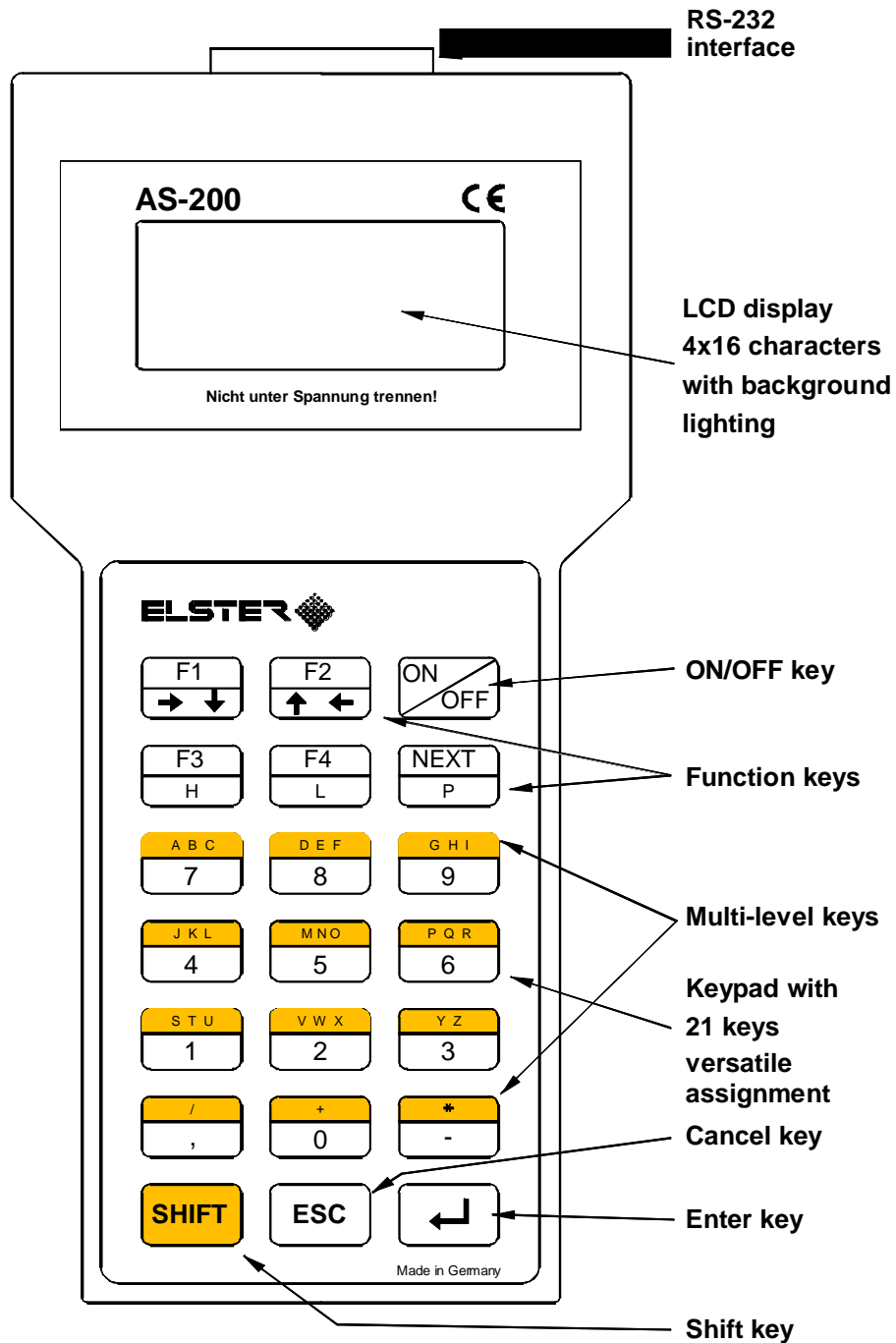
- Storage possibility for approx. 32 DL240 standard archives or for approx. 120 DS-100 channels (with an interval period of 60 min. and with monthly readout); display of the available memory capacity.
- Integral BIOS.
- Program memory (flash EPROM) erasable by software with loading software for application programs (download function)40.
- Battery operation for approx. 8 h with battery monitoring and power-save function.
- Real-time clock with high accuracy.
- Keypad designed for future applications (21 keys).
- Four-line LCD display with 16 figures per line with background illumination and contrast adjustable by software.
- RS232 interface for data transfer; optional adapter for infrared interface.
- Power supply via four Ni/Cd rechargeable batteries or four Mignon batteries; backup battery for data retention (service life > 2 years).
- LD-200 Charger (for 230 VAC) for the direct charging of the batteries in the AS-200 with charging control and changeover to trickle charging.
- Designed for use in Ex Zone 2.
- CE label.
- Ambient conditions: -10...+50° C; IP54 (without RS-232 socket)

2.2 LD-200 performance features

- Plug-in charger for connection to the AS-200 (do not use it for the AS-100!).
- Suitable for charging 2...6 Ni/Cd rechargeable batteries (0.5...0.75 Ah)
- δU method with charge control and changeover to trickle charge:
 - Power charging (800 mA; max. 10.5 V) for at least 2 min.; LED lit continuously.
 - Trickle charge (15 mA; max. 10.5 V); flashing LED (4.5 Hz).
- CE label; various other approvals.
- Ambient conditions: 0...+40° C; IP20

3 Operation

3.1 Front view



3.2 Keypad

A keypad with 21 keys is provided for the operation of the AS-200. It is of a versatile design for use with the AS-200/S2 Readout Program and with future programs. The keys have the following functions:

Function keys F1...F4 / Cursor keys →, ↓, ↑, ←:

The functions shown in the display are executed depending on the application program.

In a menu upwards and downwards movement is possible with the ↓ and ↑ keys.

When entering a value with a number of figures, the cursor can be moved one place to the left with the ← key, erasing the last character entered.

↵ key:

Enter key for terminating text or numerical entries or for selecting a menu point.

ESC key:

Cancellation of an erroneous entry or, with menus, return to the next higher level menu.

NEXT key:

Using the "NEXT" key, other functions are called where needed or, with some AS-200 device settings, discrete values are selected.

SHIFT key:

Text or special characters can be entered with the "Shift" key and the appropriate letters depending on the application program.

ON/OFF key:

Switches the AS-200 on or off. This key must be pressed for approx. one second so that it is not switched off unintentionally.

3.3 Display

The display consists of a 4x16 character alphanumeric LCD display with EL background illumination. This can be switched on and off via the BIOS (see Chapter 'BIOS'). In addition the **contrast** on the LCD display can also be adjusted here to suit on-site conditions. Depending on the ambient temperature, the contrast must be increased (for negative temperatures) or reduced (under hot conditions). The range has been designed such that "normal" operation is possible between -10° C and +40° C.

The AS-200 automatically displays in the lower right corner of the LCD display a "B" symbol as the status indicator for the battery state of charge when the batteries are running down.

3.4 Cable connection

The connection to the terminal devices (DS-100, EK-8x, TC-90/T, etc.) is provided via the AS/DS readout lead which is plugged into the 15-pole D-SUB subminiature socket. If LIS-200 devices are to be read out (DL240, EKxxx), the AS/DS readout lead must be screwed to the IR readout head.

The link to the PC (evaluation station) is formed through the same interface using the AS/WS connecting lead which is supplied with the evaluation software.



If the AS-200 is to be used in Ex Zone 2, it is essential to observe the details given in Chapter 3.6 'Applications in Ex Zone 2' as well as the 'Manufacturer's Declaration for Ex Zone 2.'

3.5 Information about the battery charger

3.5.1 Use of rechargeable or non-rechargeable batteries

The AS-200 is powered by four rechargeable batteries with 600 mAh capacity. With fully charged batteries this gives an operating period of approx. 8 hours. If this period is not sufficient, the background illumination can be switched off in the BIOS. This increases the operating period by approx. 6 hours (see Sections 3.5.3 'Battery monitoring' and 3.8.4 'BIOS settings').

Alternatively, commercially available Mignon batteries of size AA can be used, but it must be noted that they cannot be charged via the LD-200 Charger Unit. **There is a risk of explosion!**



The AS-200 must only be stored with fully charged batteries, because otherwise the internal backup battery will become discharged.

When switched off, the data is retained by the batteries for at least 6 months without recharging (for initially fully charged batteries), i.e. if not used, the AS-200 must be connected to the charger at least twice per year for approx. 14 h in order to secure the settings and to avoid draining the backup battery. This provides data retention (for more than 1 year) if the rechargeable batteries become completely discharged.



It should be noted that these details refer to storage at room temperature. With storage in cold conditions the battery capacity is reduced and for hot conditions the leakage current increases so that the time before a battery recharge is needed may be significantly shorter.

3.5.2 LD-200 Charger Unit

The rechargeable batteries are charged using the LD-200 Charger Unit supplied. For this the batteries can remain in the AS-200.



Correct charging is only provided by the LD-200 and no commercially available charger should be used. The LD-200 must only be connected to the AS-200. On no account connect it to the AS-100!

There is a risk of damage!

To ensure that the batteries are fully charged, the AS-200 should remain connected to the charger for approx. 14 h before being used. The batteries are at least 80% charged when the LED on the charger flashes at about 4.5 Hz. Continuous operation on the charger is possible, because the charging current is limited to the trickle charge level.

3.5.3 Battery monitoring

The battery voltage is continuously monitored. If a voltage drop is detected below the specified threshold voltage, a flashing "B" appears in the lower right-hand corner of the display which only disappears when the supply voltage has been restored to an adequate level. When the symbol appears, about 30 min. of operation is still possible. The AS-200 then switches off automatically to prevent exhausting the batteries.

3.5.4 Power-save functions

The AS-200 is equipped with various power-save functions. Firstly, the background illumination can be switched off via the BIOS (approx. 50% power saving, see Section 3.8 'BIOS'). In addition the AS-200 switches off automatically if no key is pressed for about 2 minutes (but only in the menus, not during entry).

3.5.5 External power supply

If the AS-200 is connected to the DKM-100 Data Compressor, this device then supplies the AS-200. The AS-200 then switches on automatically. After disconnection from the data compressor the AS-200 switches off automatically. A prerequisite for this function is that the serial interface of the DKM-100 to which the AS-200 is connected has been appropriately parameterised (see the DKM-100 Operating Manual, Section 'Configuring the terminal device interface').

3.6 Applications in Ex Zone 2

The AS-200 Readout Device is designed for use in Ex Zone 2 (Temperature Class T4) according to VDE 0165 and this is appropriately confirmed by a manufacturer's declaration from Elster in the appendix. This makes it possible to read in terminal devices which are approved for use in Ex Zone 2 by a manufacturer's declaration or Ex approval for application in Ex Zone 2. The following conditions must be present before using an AS-200 in Ex Zone 2:

- The removal or replacement of the batteries within Ex Zone 2 is not permissible.
- Connections must only be carried out with the readout device switched off.
- The plugs on the connecting lead must be screwed at both ends.

3.7 Switching the AS-200 on and off



The readout lead must be connected and screwed onto the AS-200 and on the terminal device (DS-100, EK-8x, TC-90) before switching on the AS-200. With operation in Ex Zone 2, Chapter 3.6 'Applications in Ex Zone 2' as well as the appendix 'Manufacturer's Declaration for Ex Zone 2' must be observed.

The AS-200 is switched on directly on the keypad by pressing the key "ON/OFF". Alternatively, the AS-200 is switched on by the connection of an external supply voltage (e.g. via the DKM-100).

After switching on the device an informative text briefly appears with the version code of the BIOS and the size of the data memory:

AS-200
BIOS Vx.y de
Rev. :dd.mm.yy
00768 Kbyte RAM

Then a check of the AS-200 is carried out and an existing application is sought (with quick-start or full test - see Section 3.8.4 'BIOS settings'). If correct and existing software (application) is detected, this is started (e.g. AS-200/S2 application - see Chap. 4 'AS-200/S2 application program'). Otherwise the AS-200 remains in the BIOS (see Chap.3.8 'BIOS').

The AS-200 can be switched off in two ways in normal operation. Normally, when running the application this is done by pressing the "ON/OFF" key. This must be pressed for about one second to trigger this function. Then a query follows of whether the device really is to be switched off.

In addition, the AS-200 can be switched off by a TIMEOUT. This may occur in the appropriate menus in the application if no key is pressed for about 2 min.

If power is supplied externally, the AS-200 switches off automatically when the external power supply is interrupted.

3.8 BIOS

3.8.1 BIOS functions

A BIOS (Basic Input Output System) under which the following settings can be carried out is integrated into the AS-200:

- Date and time in the AS-200.
- Contrast of the LCD display.
- Background illumination mode.
- Quickstart.
- Download of a new application.

3.8.2 Starting BIOS

The BIOS is called if:

- the key "F1" is pressed during the BIOS start message after switching on the AS-200,
- no valid application program is found or the checksum is not correct after switching on the AS-200,

3.8.3 BIOS main menu

The BIOS main menu is called after starting the BIOS.

AS-200 BIOS
F1: Setting
F2: Download
ESC: Restart

Here a restart of the AS-200 with a check for a valid application program can be executed using "ESC".

3.8.4 BIOS settings

Using "F1" access is gained to the menu: "Settings" where the following operations are possible:

```
AS-200  BIOS
F1:Date/time
F2:Contrast
F3:Illumination>
```

Here the date and time in the AS-200 can be set using "F1". It is not necessary to enter decimal points.

The contrast of the LCD can be changed with "F2" (F1: Less contrast; F2: More contrast) and "F3" changes the background illumination mode:

Key	Background illumination mode.
F1	Always off
F2 + F1	Always on
F2 + F2	Flashing for low battery voltage ("B" symbol appears)
F2 + F3	Switch off when "B" symbol appears.

The display of ">" in the lower right corner of the LCD display indicates that further settings are possible. These can be called by the key "NEXT". In this case the start mode of the AS-200:

Key	AS-200 quick-start mode
F1 + F1	No; complete checking of the application program and comparison with the stored checksum.
F2 + F1	Yes; only checking of whether a valid checksum is stored (the application program is not checked).

3.8.5 Download function

3.8.5.1 General remarks on the download function

In the BIOS main menu a download of a new application can be carried out using the key "F2". It is therefore possible to modify the program memory in the AS-200 without changing the EPROM. This function is important to enable an update of the AS-200/S2 application or the loading of completely different software via the interface.

A floppy disk with the download program for the PC is enclosed with the AS-200. This module can be integrated into the AWS-100 Evaluation Software or run as an independent program.

New application software can be transferred together with the download program via the Internet under the address www.elster.com or via e-mail. In exceptional cases a floppy disk can also be supplied.

3.8.5.2 Installation of the download software and the new AS-200 software on the PC

a) Installation under the AWS-100

All that is needed for installation is the floppy disk (3.5") to be inserted into the appropriate drive (A: or B:) and the menu point called via the AWS-100:

F7: System maintenance;

F7: Update and convert

F1: Install new software.

The rest of the installation is menu guided.

b) Installation as separate program

If the installation is to be carried out without the evaluation software, the program 'INSTALL' must be started on the floppy disk drive (A: or B:). Here also the installation is menu-guided.

3.8.5.3 Starting the download software on the PC

Once the download software has been installed on the PC (see Section 3.8.5.2), it can be started as follows:

a) With the AWS-100:

In the AWS-100 main menu:

F6: Application programs

then in the menu 'Application programs':

F4: Download AS-200

b) As separate program:

If the download software has been installed as a separate program (see Section 3.8.5.2), it can be started under:

...\AUSWERT\DOWNLOAD\DOWNLOAD.EXE.



The connecting lead from the PC to the AS-200 is essential for downloading a software program into the AS-100. This can be obtained from ELSTER Handel under the order number 730 11 173.

3.8.5.4 Executing a download

- First, the required application software must be installed on the PC (see Section 3.8.5.2)
- Then the AS-200 is connected to the serial interface (COM1 or COM2) on the PC using the AS/WS lead.



If saved consumption data is present in the AS-200, it is essential to read this out, because it will be irretrievably deleted before the download.

- The AS-200 is switched on and the key "F1" is pressed briefly during the BIOS start message. The AS-200 then remains in the BIOS and under "F2: Download" the desired baud rate can be first set with "F1" resp. "F2". The other transfer parameters (no parity, 8 bits, 1 stop bit) are already defined.
- After pressing the key a notice appears about data loss in the AS-200. If important data is still present in the device (e.g. consumption data from read-out volume correctors or data storage devices), the procedure can be interrupted with the "ESC" key. Otherwise, the message is acknowledged and, after deleting the data in the RAM, the AS-200 goes into the download mode and waits for the transfer of the data:

DOWNLOAD

Waiting for data

- The download program in the PC is started (see Section 3.8.5.3), the required software¹ is selected in the selection window and then the baud rate which is set in the AS-200 and the interface used are selected. Save the settings with "F9" and finish with "F10". The transfer is then started by pressing the Enter key twice on the PC. The transferred blocks are displayed in the PC and in the AS-200.
- Then the transferred software is tested, the FLASH EPROM erased and the application burned into the FLASH EPROM.

¹ V<8.00: AS-200 Software for reading out exclusively LIS-100 devices (DS-100/x, EK-8x)
V>=8.00: AS-200/S2 Software for reading out LIS-100 and LIS-200 devices (DL240, EK260)

- Finally, the data memory is erased and formatted and the application started; the user is requested to enter the AS-200 serial number.
- The download is then terminated.

3.8.5.5 Error messages during the download

If errors are detected during the transfer or during burning of the EPROM, they are displayed. The message numbers have the following meaning:

Error	Meaning	Checking / rectification
00001	Interface parameter (incorrect baud rate)	Check the baud rate in the AS-200 and in the PC.
00002	Error in the HEX file (Checksum error, cancellation of transfer or buffer overflow)	Plug not inserted correctly; "ESC" key pressed; no switchover under Windows; reduce baud rate.
00003	Address conflict.	Addresses of the HEX files are located outside the permiss. range -> please inform ELSTER.
00004	Error in RAM.	RAM damaged or the application is too large; -> please inform ELSTER
00005	Checksum in flash EPROM (Error on checking the EPROM, on starting or during burning).	Try repeating download; at 2nd unsuccessful attempt: Device error -> please inform ELSTER.
00006	Incorrect type of flash EPROM (unknown type or no programming possible).	Device error; -> please inform ELSTER.

4 AS-200/S2 application program

4.1 General remarks about AS-200/S2 application program

The AS-200 is normally equipped with the readout program for data storage devices and volume correctors of the systems LIS-100 and LIS-200. In this operating manual the readout program is designated as the AS-200/S2 application program.

The AS-200/S2 application program automatically detects whether an LIS-100 or an LIS-200 device is connected. If an LIS-100 device is connected (e.g. DS-100/x, EK-8x), the function of the AS-200/S2 application program corresponds to the earlier AS-200 and AS-100 software versions. With regard to the AS-100 only the user interface (keypad) has been matched to the AS-200 keypad.

4.2 Starting the AS-200/S2 application program

After starting the AS-200 with the green **ON/OFF key**, the BIOS message appears in the display:

```
AS-200
BIOS Vx.y de
Rev. : dd.mm.yy
00768 Kbyte RAM
```

Provided the start mode 'Quickstart' is not activated in the BIOS (see Section 3.8.4), the BIOS message remains in the display for the duration of the program memory test (about 30 s).

If the Quickstart is activated, a valid application program is immediately sought. If one is found (after about 2 s), it displays its identification, the program version and the date of the program version.

```
ELSTER
Readout Program
AS-200/S2 Vx.xx
Rev. : dd.mm.yyyy
```

This message is displayed while the data memory is being checked. This may take a few minutes depending on the quantity of stored data. To save this time, the data

memory check can be suppressed with the function "Skip memory test" in the menu 'Memory settings' (see Section 4.4.7.5) or with the setting function "8886" (see explanation of index number "8886").

Then a self-test is executed and the number of DS-100 devices (or channels) that have already been read in as well as the memory space still available is displayed.

```
Devices/channels
Memory:    0
Free:    747 KByte
Press a key !
```

The main menu appears on pressing a key.

```
Main menu
→ Read out
Parameterise
↓ Display
```

The arrow ↓ in the bottom line indicates that other options can be displayed with the key F1/→ ↓ :

```
Main menu
↑ Parameterise
Display
→ Settings
```

If the AS-200 is linked to a PC/laptop on which the AWS-100 or WinLIS evaluation software is active, the display of the available memory space is omitted and the program directly enters the main menu. The AS-200/S2 can only be first addressed by AWS-100 or WinLIS when it displays the main menu.



Here it should be noted that through an interruption in the link between the AS-200 and the evaluation station, the data transmission mode is retained and the AS-200 can only be reset by a timeout after about 2 minutes. Therefore it is advisable to screw the connecting lead!

During the data transmission to the AWS-100 or WinLIS, the switch-off function is suppressed.

4.3 Operating the keypad in the AS-200/S2 application program

4.3.1 Selection of a menu item

The menu items can be approached with the ↓ and ↑ keys and selected with the ↵ - key. You can return to the higher level menu with the ESC key.

4.3.2 Selecting a discrete value

If, for example, a number of discrete values are possible for an AS-200/S2 device setting, these can either be directly selected with the number keys 1...max. 9 (e.g. 1...3, if only three values are possible) or you can display the values consecutively with the NEXT key until the required one appears. This value can then be selected with the ↵ - key, after which the program moves back to the menu. If a value is directly selected with the number keys 1...9, then the ↵ - key must be pressed twice to return to the menu. You can quit the entry without making a change by using the ESC key and return to the menu.

4.3.3 Entering a numerical value

The individual numbers are entered with the number keys 0...9. The input made up to that point can be discarded with the ESC key. The number to the left of the current entry position can be deleted with the ← key. The numerical entry is terminated with the ↵ - key.

4.3.4 Entering text (character mode)

The entry of letters (character mode) is initiated by pressing the SHIFT key once; the cursor is then represented by a flashing rectangle. Then the required letter can be selected. If the required letter is shown at the second or third level on a key, then this key must be pressed a corresponding number of times. The corresponding letter is accepted about one second after the last key depression. Then the next letter can be entered.

By pressing the SHIFT key the text mode is switched off again. The cursor is now represented by the underscore (_).

In this way alphanumeric strings can be entered.

The cursor can be moved one place to the left with the ← key. This deletes the last character entered.

The displayed string can be deleted from the display with the ESC key. The cursor then moves back to the left position. Pressing the ESC again terminates the entry. If an entry is cancelled with ESC, the old value is retained.

An entry is terminated, accepting the value entered up to that point, using the ← - key.

The length of the text or an alphanumeric string to be entered is determined by the formatting details of the value itself and is automatically limited by the entry routine.

4.4 AS-200 device settings

4.4.1 Settings menu compared to Index number entry

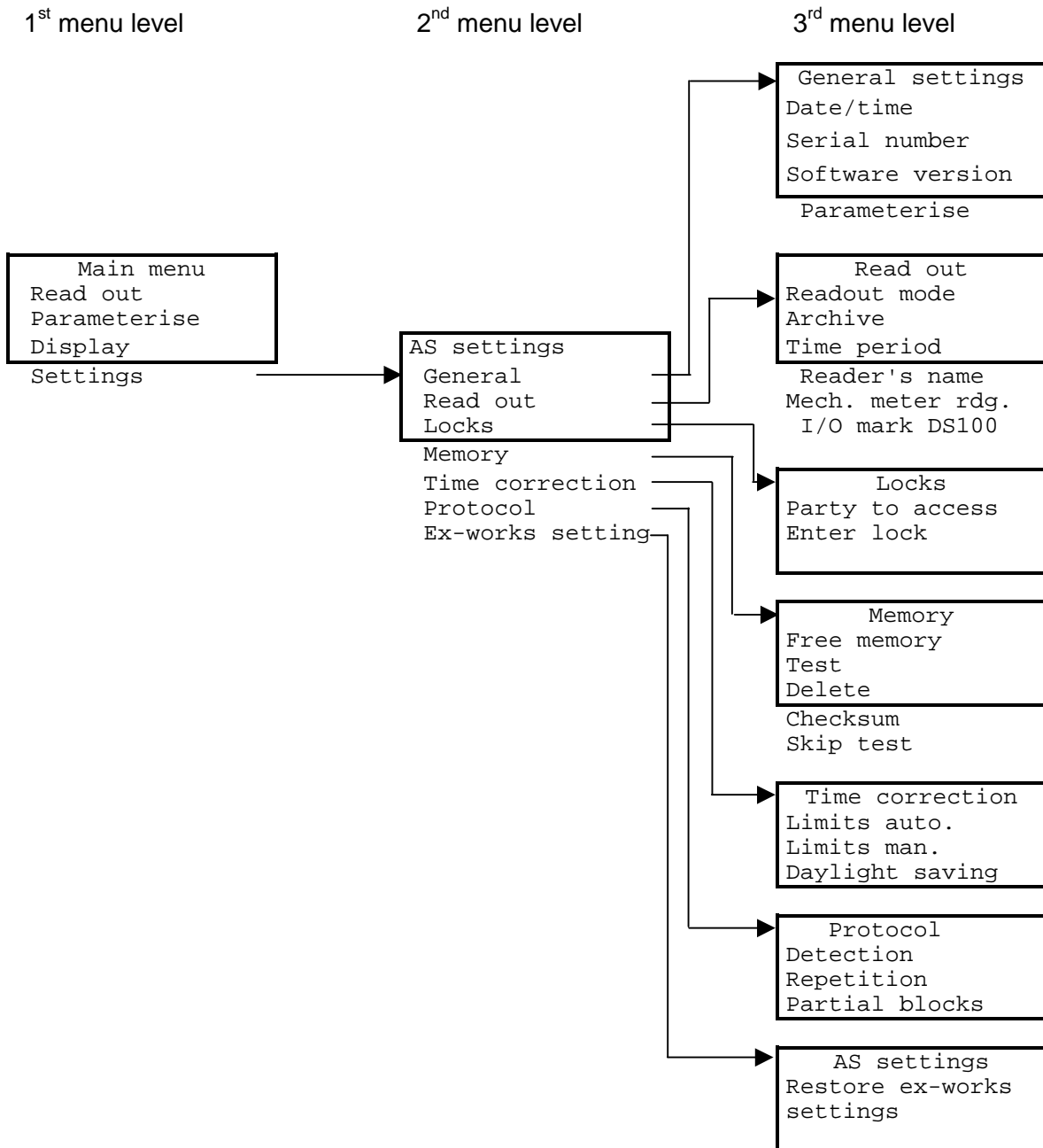
In the AS-200/S2 software a clearly laid-out menu structure is available for changing the AS-200/S2 settings (see Section 4.4.2). This enables the user to make any changes to the AS-200/S2 settings that are necessary more conveniently than was possible with the earlier AS-100/200 versions (≤ 8.0) with which changes had to be made using the Index number entry.

Since however the Index number entry still had to be possible because the LIS-100 terminal devices could only be parameterised via the Index numbers (see Section 4.5.2), some AS-200/S2 device settings can still be set using Index numbers.

For those users who are used to making settings from earlier AS-100/200 versions via the Index number entry, the Index numbers relevant to the AS-200/S2 settings are listed in the table in Section 4.4.3.

4.4.2 Menu structure for changing the AS-200/S2 device settings

To change the device settings, the item "*Settings*" is selected in the main menu. This is the last item in the main menu and can be displayed with the aid of the ↓ key. The menu structure for the AS-200 device settings is as follows:



4.4.3 Effect on working with LIS-100 and LIS-200 devices

The individual AS-200 settings can have an effect on:

- Exclusively the AS-200 itself.
- Exclusively on the reading out or parameterising of LIS-100 devices.
- Exclusively on the reading out or parameterising of LIS-200 devices.
- The reading out and parameterising of all devices (LIS-100 **and** LIS-200 devices).

The following table states what is affected by the AS-200 device setting and which menu item corresponds to which Index number:

Setting		Affects		
Menu	corresponding index number	AS-200	Reading out or parameterising of LIS-100 devices.	Reading out or parameterising of LIS-200 devices.
General settings				
Date/time	999	x	x	x
Serial number	---	x		
Software version	---	(x) (read only)		
Parameterising (release/blocking)	---	x	x	x
Settings for reading out terminal devices				
Readout mode	---	x		x
Archive	333	x	x	x
Time period	---	x		x
Reader's name	1	x	x	x
Mech. meter rdg.	---	x	x	x
I/O mark DS-100	1117	x	x	
Lock settings				
Party to access	---	x		x
Combination	555	x	x	x
Memory				
Free memory	---	x		
Test	8887	x		
Delete	8888	x		
Checksum	---	x		
Skip test	8886	x		
Time correction				
Limits auto.	---	x	x	x
Limits man.	---	x	x	x
Daylight saving	---	x	x	x
Protocol				
Detection	---	x		
Repetition	---	x		x
Partial blocks	---	x		x
AS settings				
Restore ex-works setting	---	x	x	x

4.4.4 General settings

4.4.4.1 Date/time setting

The date and time in the AS-200/S2 can be set with this function. The date is entered in the format [dd.mm.yy] and the time in the format [HH:MM:SS]. The separators ('.' and ':') are set automatically by the device and therefore do not need to be entered.

[dd.mm.yy] means: day (2-figure), month (2-figure), year (2-figure)

[HH:MM:SS] means: hour (2-figure), minute (2-figure), second (2-figure)

The entry is terminated with the \leftarrow - key. If the \leftarrow - key is pressed without the date or time being first changed, the corresponding entry is skipped without any modification. You can quit the entry without making a change by using the ESC key and return to the menu.

4.4.4.2 Serial number setting

The serial number of the AS-200/S2 can be set with a maximum of 12 places with this function. No leading zeroes or space characters need to be entered. The entry is terminated with the \leftarrow - key. You can quit the entry without making a change by using the ESC key and return to the menu.

4.4.4.3 Display software version

The software version of the AS-200/S2 can be displayed with this function. The software version cannot be overwritten. You can quit the display by using \leftarrow - key or the ESC key and return to the menu.

4.4.4.4 Parameterising function (release/blocking)

With this function you can set whether the AS-200/S2 can just read out terminal devices (setting '0') or whether they can also set the parameters (setting '1').

This setting applies both to parameterising the LIS-100 as well as LIS-200 terminal devices.

4.4.5 Settings for reading out terminal devices

4.4.5.1 Readout mode

With this function one of the following three readout modes can be set for reading out LIS-200 terminal devices:

- Automatic (Setting 0)
- Preset (Setting 1)
- Manual (Setting 2)

The meaning of the individual readout modes is explained in Chapter 4.6.3.



This setting only affects the reading out of LIS-200 terminal devices. The readout mode for reading out LIS-100 devices can be set via the index number B333 (see Chapter 4.5.2.6, Explanation of index number B333) or via the setting 'Archive to be read out' in the menu 'Settings - Readout - Archive' (see Section 4.4.5.2).

4.4.5.2 Archive to be read out

Under this menu point "Settings - Readout - Archive" and for reading out LIS-200 terminal devices (e.g. DL240, EK260) in the "preset" readout mode (see Sections 4.4.5 and 4.6.3.4), you can define whether all archives are automatically read out consecutively or whether they must be acknowledged individually.

- Automatic (all archives, automatically consecutively)
- Interactive (according to interactive selection)
- Manual (according to interactive selection; on reading out LIS-200 terminal devices, this has the same significance as the "Interactive" setting.)



When reading out **LIS-200** terminal devices, this setting only has an effect when the readout mode has been selected as 'Preset' (see Sections 4.4.5 and 4.6.3.4). In this case there are no differences between the settings "Interactive" and "Manual".

On reading out LIS-100 terminal devices (e.g. DS-100/x, EK-8x) the setting has the following effect on the reading out of the LIS-100 device channels:

- Automatic (all channels automatically consecutively)
- Interactive (according to interactive selection)
- Manual (Only the currently active terminal device channel is read out. This must be set manually on the terminal device before the start of the readout.)



On reading out **LIS-100** terminal devices the setting "Archives to be read out" corresponds to the setting which can be made under the index number **B333** (see Section 4.5.2.6, Explanation of index number B333).

4.4.5.3 Time period

With this function you can set from which time period the archive data is to be read out for the readout of LIS-200 terminal devices. For this there are five possible settings:

- Last readout (back to the last readout, Setting 1)
- Previous month (Setting 2)
- Previous month up to today (Setting 3)
- Complete (complete archive, Setting 4)
- Entered time period (freely definable time period, Setting 5)

The meaning of the individual settings is described in Chapter 4.6.3 'Reading out LIS-200 devices'.



This setting only affects the reading out of LIS-200 terminal devices in the **'Preset'** mode (see Section 4.6.3.4). When reading out in the **'Manual'** mode, the setting is made directly before each readout of a channel (see Section 4.6.3.5).

When reading out in the **'Automatic'** mode (see Section 4.6.3.2), the readout time period is determined by the readout note "Readout time period" saved in the LIS-200 terminal device (e.g. DL240, EK260) separately for each archive. This can be set in the terminal device via the menu "Parameterise - Archives" with the AS-200/S2 (see Section 4.6.2.7).

4.4.5.4 Reader's name

With this function a reader's name with a maximum of twelve alphanumeric characters can be entered. Alphanumeric means that figures and letters can be entered. You must switch on the character mode with the SHIFT key to be able enter letters. The use of the keypad in the character mode is described in Section 4.3.4.

The reader's name entered here is used both for reading out LIS-100 and LIS-200 terminal devices. It can however be changed via the index number B1 (see Section 4.5.2.6, Explanation of index number B1). However, only numbers can be entered via the index number B1.

4.4.5.5 Releasing/locking the entry of the reading of the mechanical meter

With this menu point you can set whether the entry of the counter reading of the mechanical meter (= "Mech. meter rdg.") is possible before the reading out of a measurement period archive on an LIS-200 terminal device (e.g. DL240, EK260) or an LIS-100 terminal device channel (DS-100/x, EK-8x). Further information about the mech. meter reading can be found in the Section 4.6.3.2.

The entry of the mech. meter reading is suppressed in the AS-200/S2 ex-works setting.

4.4.5.6 I/O mark DS-100

With this function you can set the variable I/O mark for reading out LIS-100 terminal devices in the range from 0...255.

The variable I/O mark which can be set here is identical with that settable under the index number B117 (see Chapter 4.5.2.6, Explanation of setting function B117). There its meaning is described in detail.



The variable I/O mark only has an effect on the reading out of LIS-100 terminal devices (e.g. DS-100, EK-8x), but not on the reading out of LIS-200 terminal devices (e.g. DL240, EK260).

4.4.6 Lock settings

4.4.6.1 Party to access

With this function the party having access can be set as the one who accesses the AS-200/S2 on a LIS-200 terminal device.

The following parties to access can be set:

Parties to access	
Number	Designation
1	Calibration office
2	Manufacturer
3	Supplier
4	Customer
5	Checking
6	Authorised Access No. 6 (reserve)
7	Authorised Access No. 7 (reserve)
8	Authorised Access No. 8 (reserve)

This setting only affects data transmission with LIS-200 terminal devices. It has no significance when working with LIS-100 terminal devices.

4.4.6.2 Entering combinations

With this function an access code (combination) with a maximum of 8 places can be set in the AS-200/S2. After the link with an LIS-100 or LIS-200 terminal device has been established, this is automatically compared with the access code (lock) stored in the terminal device. Depending on the terminal device generation (LIS-100 or LIS-200), the following applies:

LIS-100:

In LIS-100 terminal devices only a single access code (lock) is stored per channel with which the access code (combination) is compared with that saved in the AS-200/S2:

- With a valid access code: The terminal device can be read out without restriction. The following can be set: Variable I/O mark (see Sections 4.4.5.6 and 4.5.2.6 under Explanation of index no. B1117 'Set variable I/O mark'), time at the permissible limits (see Section 4.4.8), reader's name.
- With an invalid access code: The terminal device can be read out without restriction. However, only the variable I/O mark can be set.



With multi-channel LIS-100 terminal devices (e.g. four-channel DS-100/A) each channel counts as a device. Each channel has its own access code (lock). Ex-works the access codes are set to '00000000'.

LIS-200:

In LIS-200 terminal devices a lock is stored for each party to access (see Section 4.4.6. Ex-works the locks for all parties to access are set to '00000000'. Depending on under which party entry to the LIS-200 terminal device is to be obtained using the AS-200/S2, the combination saved in the AS-200/S2 is compared with the corresponding lock in the LIS-200 terminal device.

- With a valid combination: Access is obtained to all values which are released for the corresponding party to access in the LIS-200 terminal device. In the terminal device for each value, there is a definition of which party to access can read and/or overwrite the value. This means that for each party to access the read and write rights can be set independent of one another.
- With a invalid combination: No access is obtained to any values, neither write nor read.



The combination that can be set here affects data transmission with LIS-100 and LIS-200 terminal devices. It is identical with the combination which can be set under the index number B555 (see Section 4.5.2.6, Explanation of index number B555).

4.4.7 Memory functions**4.4.7.1 Free memory**

After selecting this menu item the AS-200/S2 display shows from how many terminal devices data has been already saved in the AS-200/S2 and how many kBytes of memory are still free:

```

Devices/channels
Saved:    0
Free:    747 KByte
Press a key !

```

The program returns to the menu on pressing a key.

4.4.7.2 Test

After selecting this menu item the data memory (RAM) of the AS-200/S2 is first checked **and then cleared**. Since this function **irretrievably deletes** the data, its selection must be confirmed with the key '1'. You can return to the menu with the key '0'.

```

Memory test
Clear data !
Execute?
1=Yes 0=No

```

Since checking the data memory may take some minutes depending on the quantity of saved data, the message 'RAM test running' appears in the display during the check.

After the end of the RAM test, you are requested to press any key and then the data memory is cleared. Clearing the data memory may take a few minutes depending on the quantity of data. During this period the message 'Clearing memory' is shown on the display. Then the program automatically returns to the menu.

The AS-200/S2 device settings are not affected by the deletion process.

4.4.7.3 Deletion

After selecting this menu item the data memory (RAM) of the AS-200/S2 is cleared. Since this function **irretrievably deletes** the data, its selection must be confirmed with the key '1'. You can return to the menu with the key '0'.

Clearing the data memory may take a few minutes depending on the quantity of data. During this period the message 'Clearing memory' is shown on the display. Then the program automatically returns to the menu.

The AS-200/S2 device settings are not affected by the deletion process.

4.4.7.4 Checksum

With the selection of this menu item all the data located in the data memory of the AS-200/S2 is checked for the checksum. First an appropriate confirmation request is made because the process may take a few minutes depending on the quantity of data.

During this period the message 'Checking checksum' is shown on the display. Then the program automatically returns to the menu.

4.4.7.5 Skip memory test

With this setting you can suppress the test of the data memory which is automatically carried out after the AS-200 is switched on (see Section 4.2). Mainly, this is practicable when the test of the data memory takes up too much time due to a large quantity of data.

4.4.8 Time correction

4.4.8.1 Limits for automatic time correction

With this setting you define the maximum time deviation in minutes for which the time in the terminal device is automatically corrected after the readout (without confirmation by the reader).

It is more logical to set the limits for an automatic time correction tighter than the limits for a manual time correction (see Section 0).



To avoid an incorrect time being set in the terminal device, it is advisable to check the time in the AS-200/S2 before the first readout with a new AS-200/S2 (see Section 4.4.4).

4.4.8.2 Limits for manual time correction

With this setting you define the maximum time deviation in minutes by which the time in the terminal device can be corrected with confirmation by the reader after the readout.

It is more logical to set the limits for a manual time correction wider than the limits for an automatic time correction (see Section 4.4.8).



To avoid an incorrect time being set in the terminal device, it is advisable to check the time in the AS-200/S2 before the first readout with a new AS-200/S2 (see Section 4.4.4).

4.4.8.3 Daylight saving

With this setting the changeover for daylight saving can be controlled as follows:

- Setting = 0 (no daylight saving)
No change of time is made for daylight saving.
- Setting = 1 (automatic changeover)
The daylight saving change to summer time occurs according to the currently valid algorithm from the PTB.

The setting for daylight saving is switched off (Setting 0) in the AS-200/S2 ex-works setting.

4.4.9 Protocol settings

4.4.9.1 Detection

With this setting the sequence for the protocol detection can be defined. The protocol detection is executed automatically before each data transmission to detect whether the terminal device is an LIS-100 (DS-100 protocol) or an LIS-200 terminal device (IEC 1107 protocol). The following settings are possible:

Settings for the protocol detection		
Number	Meaning	protocol detection
0	First DS-100, then IEC 1107 protocol	on
1	First IEC 1107, then DS-100 protocol	on
2	Only DS-100 protocol.	off ¹
3	Only IEC 1107 protocol.	on

⁽¹⁾ The protocol detection is switched off with this setting so that the users who are used to the setting functions via Index number entry from earlier AS-100/200 software versions can also continue to use these to the full extent.



If you want to change the AS-200 device settings via Index number entry (see Sections 4.5.2.1 and 4.5.2.2) when there is **no** LIS-100 terminal device connected, then the protocol detection must be switched off using the setting "Only DS".

Setting 2 (Only DS-100 protocol) is only practicable, if you only want to read out LIS-100 terminal devices with the AS-200/S2.

Select Setting 3 (Only IEC 1107 protocol) if you only have LIS-200 terminal devices.

4.4.9.2 Repetition

This setting defines how often an erroneously transferred data telegram can be repeated. Valid values are 0...9. In the ex-works setting this value is set to three. This setting only affects data transmission with LIS-200 terminal devices using the IEC 1107 protocol.

With data transmission with LIS-100 terminal devices using the DS-100 protocol the number of possible repetitions is permanently set to three.

4.4.9.3 Partial blocks

With this setting you define how many data records of an archive can be transferred per IEC 1107 data telegram (partial block). Valid values are 0...999. In the ex-works setting in the AS-200/S2 this value is set to 1.

This setting only affects the IEC 1107 protocol, i.e. data transmission with LIS-200 terminal devices. The data telegrams are permanently defined in the DS-100 protocol which is used for reading out LIS-100 terminal devices.

4.4.10 Ex-works setting

By selecting this menu item you can restore the ex-works setting of the AS-200/S2. In the ex-works setting the AS-200/S2 is set as follows:

Setting	Default	Meaning
Date / Time	01.01.99 08:00:00	
Serial number	000000000000	
Parameterise	Yes	Parameterising is permitted.
Readout mode	1	Preset
Archive to be read out	0	Automatic (all archives)
Readout time period	3	Previous month up to today
Reader's name	"Blank"	
Entry of mech. meter reading	0	Entry not possible.
I/O mark	0	(Only for DS-100 function).
Party to access	3	Supplier
Combination (enter)	00000000	
Skip memory test	0	No
Limits for autom. time correction	5	+/- 5 minutes
Limits for man. time correction	30	+/- 30 minutes
Daylight saving changeover	No	No daylight saving
Sequence for protocol detection	IEC then DS	First IEC 1107, then DS protocol.
No. of telegram repetitions	3	3 repetitions when error occurs.
Number of data records per partial block	1	1 data record per partial block

4.5 Working with LIS-100 devices

4.5.1 General remarks on working with LIS-100 devices

When setting and reading out LIS-100 terminal devices (e.g. DS-100x, EK-8x), the function of the AS-200/S2 application program corresponds to the earlier AS-200 software versions and that of the AS-100. Compared to the AS-100 only the user interface (keypad) on the AS-200 keypad has been adapted (see Section 4.3).

4.5.2 Setting values

4.5.2.1 General remarks on setting of LIS-100 devices

When working with LIS-100 devices both the setting of adjustments in the AS-200 as well as adjustments in the LIS-100 terminal device (DS-100/x, EK-8x, etc.) are included in 'Setting values'.

The settings can in part only be made via the Index number entry as with earlier AS-200 software versions, but in part they are also accessible via the new menu structure.

Generally, the following applies:

1. All settings necessary for working with LIS-**100** devices can be made via the Index number entry.
2. All settings necessary for working with LIS-**200** devices are accessible via the menu structure. Index numbers do **not** need to be entered.
3. Some AS-200 device settings can be both entered conventionally via the index number (B1, B333, B555, B999, B1117, B8886, B8887, B8888, see below in this chapter) as well as via the menu structure (see Section 4.4).
4. Using the index number entry adjustments can be made to both AS-200 device settings (B1, B222, B333, B444, B555, B999, B1117, B8886, B8887, B8888) as well as settings in the LIS-100 terminal devices (B0, B2, B7, B8, B10, B11, B20, B21, B22, B666).



If you want to change the AS-200 device settings via Index number entry when there is no LIS-100 terminal device connected, then the protocol detection must be switched off using the setting "Only DS" (see Section 4.4.9).

5. In the explanations of the setting functions using Index numbers (see below in this chapter) a note is given of when a setting is also possible via the menu structure. In the explanations of the AS-200 setting functions via the menu structure (see Section 4.4) a note is made when a setting is also possible via a Index number.

When setting values, the following special features should be observed:

- **Readout modes:**
The readout modes 'automatic', 'preset' and 'manual' which can be set in the menu 'Settings - Readout - Readout mode' only apply to the reading out of LIS-200 devices (e.g. DL240, EK260). For the reading out of LIS-100 devices (DS-100/s, EK-8x, etc.) the readout modes 'automatic', 'interactive' and 'manual' can be set via the index number „333“. Setting via the index number „333“ corresponds to the setting 'Archive to be read out' which can be made via the menu "Settings - Readout - Archive'.
- **Reader's name:**
In the menu 'Settings - Readout - Reader's name' the reader's name can be entered alphanumerically (numbers and letters), whereas it can only be entered numerically (only numbers) under the index number „1“.

The setting functions are used amongst other functions for the entry of the date and time, customer, meter and device numbers, as well as the cp value, interval time, counter reading entry for the adjustable counter and the configuration of the DS-100.

For the index numbers "0", "2", "8", "666" and "777" the required channel can be selected after entering the values and the presetting on the DS-100 is then omitted. With successful transmission of parameters to the DS-100, a data block is created in the AS-200 except for "7", "8", "10", "11", "20", "21" and "22".

Both newly installed DS-100 storage devices can be programmed as well as those already installed.

Only the quantities are transferred to the DS-100 for which values have been entered. If no entry has been made for a quantity (e.g. cp value), the data already present in the DS-100 is retained unchanged. Values once entered are cleared after transmission to the terminal device or on switching off the readout device; exceptions are "Reader's name" ("1"), "Default settings for reading out" ("333"), "Transmission with parity" ("444"), "Access detection" ("555"), "Time and date" ("999") and "Variable I/O mark" ("1117").

The time and date are, if possible, corrected on setting and reading out the storage device (see Section 'Reading out LIS-100 devices').



Some parameter which are important for saving interval values in the DS-100 only become effective at next full hour (e.g.: A change of interval time); a change of cp value is only accepted at the start of the next interval.

4.5.2.2 Calling the setting functions

To set values in LIS-100 devices (DS-100/s, EK-8x, etc.), you select the option 'Parameterise' in the main menu.

```
Main menu
Read out
→ Parameterise
↓ Display
```

Then the AS-200/S2 checks whether an LIS-100 or an LIS-200 terminal device is connected ('Automatic protocol detection', see also Section 4.4.9). If the AS-200/S2 detects that an LIS-100 terminal device is connected, the request is made for the entry of a index number, familiar from the AS-100 and earlier AS-200 software versions.

```
Set data
Index no:
```

If, instead of this, the parameterise menu appears,

```
Parameterise
Device
Inputs
Outputs
```

an LIS-200 terminal device has been detected. The parameterising of LIS-200 terminal devices is described in Section 4.6.2.

4.5.2.3 Entry of meter data without a connected terminal device

4.5.2.3.1 Protocol detection enabled

If the automatic protocol detection (see Section 4.4.9) has not detected any terminal device after the selection of the menu item 'Parameterise', the following message appears in the display:

```
No device
connected !
Continue <←↵>
Main menu <ESC>
```

After pressing the \leftarrow -key you have the possibility of entering the cp value, meter number and the adjustable counter reading even without a connected terminal device. These three values are temporarily saved in the AS-200/S2.

This is useful if you would like to parameterise a terminal device which is spatially separate from the meter. You can read the meter data on the meter and enter it directly into the AS-200/S2. The values no longer need to be noted on paper.

Then you go to the terminal device **without switching off the AS-200/S2** and connect the AS-200/S2 to the terminal device. In the meantime the following is displayed on the AS-200/S2:

```
Transmit
entered
data?
<↵>Yes, <ESC>No
```

After pressing the \leftarrow - key, first the automatic protocol detection is used to find out whether an LIS-100 or an LIS-200 terminal device is connected. Then the previously entered values are transferred to the terminal device with the appropriate protocol (DS-100 or IEC 1107).

You can return to the main menu with the ESC key without setting the values.

4.5.2.3.2 Protocol detection disabled

If the protocol detection is switched off (setting "Only DS", see Section 4.4.9), the entry of a index number is requested after selecting the menu item "Parameterise".

```
Set data
Index no:
```

After entering the index number 2, the meter, customer and device numbers, cp value, measurement interval and the adjustable counter reading can be entered also when the LIS-100 terminal device is not connected. Before the last entry (adjustable counter reading) is terminated with the \downarrow -key, the AS-200 must be connected to the LIS-100 terminal device. The AS-200 should not in the meantime be switched off. Once the LIS-100 terminal device has been connected and the \downarrow -key pressed, the query appears of whether a fixed I/O mark is to be set (see Section 4.5.2.6, Explanation of the index number B8). The entered data is then transferred to the LIS-100 terminal device.

4.5.2.4 List of index numbers for the setting functions

Ref. code	Setting function	Affects ¹	Also via menu
0	Parameterisation of the "number" parameter in the LIS-100 terminal device.	D	
1	Set reader's name or code number in the AS-200/S2.	A	x
2	Entry of the code numbers in the LIS-100 terminal device.	D	
7	Set cp value and cpz value in the LIS-100 terminal device.	D	
8	Set fixed I/O mark in the LIS-100 terminal device.	D	
10	Configuration of LIS-100 terminal device.	D	
11	Set alarm limit in the LIS-100 terminal device.	D	
20	Set unit in the LIS-100 terminal device.	D	
21	Set day boundary in the LIS-100 terminal device.	D	
22	Set changeover times in the LIS-100 terminal device.	D	
222	Skip variable I/O mark when reading out LIS-100 terminal devices.	A	
333	AS-200 default setting for reading out LIS-100 terminal devices.	A	x
444	Data transmission with parity (for reading out a Z90).	A	
555	Entry of the access code in the AS-200/S2.	A	x
666	Change the access code in the LIS-100 terminal device.	D	
777	Memory dump (complete readout of an LIS-100 terminal device).	F	
999	Set time and date in the AS-200/S2.	A	x
1117	Set variable I/O mark in the AS-200/S2.	A	x
8886	Skip data memory test after switch-on.	A	x
8887	Data memory test of the AS-200/S2.	F	x
8888	Clear data memory content in the AS-200/S2.	A	x

4.5.2.5 Relationship between cp and cpz values

Basically, two pulse weighting factors exist in the DS-100 - the so-called "cp value" (data cp value) and the "cpz value" (meter cp value). The cp value is the standard pulse value and can only take on decade values (0.01; 0.1; 1; 10; etc.). It is primarily used for weighting the stored data, but is also used for converting the input pulses by devices which can only process decade pulse weighting factors. For meters with non-decade output pulses DS-100 devices must be used which can process these pulses. These devices also have the possibility of entering the cpz value. The unit of the pulse weighting factors (cp and cpz values) is 1/kWh resp. pulses/kWh or 1/m³ resp. Imp/m³ depending on the type of device. When connecting data storage devices to dry gas meters special attention should be paid, since generally the reciprocal of the cp value,

¹ D - Value set in the LIS-100 terminal device (e.g. DS-100).

A - Value set in AS-200.

F - Function, no value is set.

the pulse value "I", is stated on this type of gas meter. The unit of the I-value is m^3/pulse . The cp value is calculated from the I-value by a simple division:

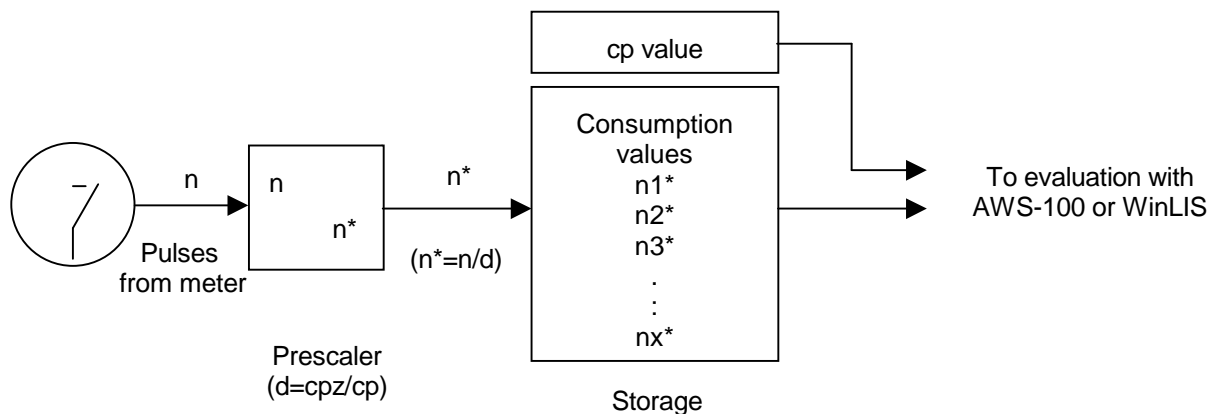
e.g.: $I=10 \text{ m}^3/\text{pulse} \rightarrow \text{cp}=0.1 \text{ pulses}/\text{m}^3$ and for $I=1 \text{ m}^3/\text{pulse} \rightarrow \text{cp}=1 \text{ pulses}/\text{m}^3$

DS-100 devices without cpz value:

In these devices, which only work with the cp value, the incoming pulses are just counted and saved. To display the volumes the decimal point is set in dependence of the cp value.

DS-100 devices with cpz value:

These devices work with the cp value and the cpz value. The incoming pulses are converted with a prescaler (see illustration) and then saved.



Example:

With an interval value of counter pulses of $n=154$ and $\text{cpz}=50 \text{ pulses}/\text{m}^3$ (corresponding to $V=3.08 \text{ m}^3$), then with a prescaler $d=5$ and an interval value in memory of $n^*=30$, then pulses are produced with $\text{cp}=10 \text{ pulses}/\text{m}^3$ (corresponding to 3 m^3). The remaining four pulse are carried over to the next interval, so avoiding a pulse loss.

This example applies correspondingly to other units (e.g. kWh or MJ).

4.5.2.6 Explanation of the individual setting functions (index numbers)

"0" Parameterisation of the "number" parameters in the storage device

This code is provided for the entry of values and parameters in relation to the counting process in the storage device. For data storage devices which work with the so-called cpz values (e.g. DS-100/V), the explanations for index number "7" should be noted.

The following data can be entered or changed under "0":

- cp value (0.01; 0.1; 1,0; 10 or 100)
- Interval time (2, 3, 5, 10, 15, 20, 30 or 60 minutes, 24 hours)
- Adjustable counter.



The cp value cannot be set to any freely selectable value in the EK-8x Volume Correctors (see operating manuals for the volume correctors).



A change in the cp value only becomes effective at the start of the next interval whereas a change in the interval period only becomes effective at the next full hour.



In the newer versions of the EK-8x Volume Correctors the "adjustable counters" correspond to the "genuine counters" in the volume correctors and cannot be released from this relationship.

Note:

The adjustable counter can be set to the value of the mechanical meter for a simple comparison of the equivalence of the meter readings. If the value is to be used for a running system, a slightly higher value can be entered into the AS-200. When the mechanical counting mechanism reaches this value, the meter reading can be transferred to the DS-100, which immediately accepts it, by pressing "1".

If a value for the adjustable counter is to be entered, then it is essential to enter the cp value first.

The adjustable counter can be set to the value of the mechanical meter. The post-decimal places are taken into account according to the selected cp value.

cp value	Valid entries	Display in the DS-100
10	123456789.12	123456789.10
1	123456789.1	123456789.0
0.1	123456789	123456780

Here, leading zeroes are not entered. The right-hand number is always set to zero.

Once all three parameters are entered and acknowledged, the channel to be set is displayed and the values transferred in a block after the requested confirmation ("1"). If this is not the case ("0"), the next channel for "setting" is selected. After all channels have been passed through and none have been confirmed, the setting procedure is cancelled.

"1" Reader's name or code number

After entering the index number "1", the reader's name or code number present in the AS-200 can be changed as required. Once entered the value is retained until it is changed again. For a code number a character string (0...9 and "-") with a maximum of twelve characters can be entered. The entry of other characters is only possible via the

menu 'Settings -Readout - Reader's name' (see Section 4.4.5.4) or with the AWS-100 program. Umlauts (Ä, ä, Ö, ö, Ü, ü) and "ß" are not permissible.

"2" Code number entry in the terminal device

After entering the index number "2", the customer, meter and device numbers (each of 12 places) can be re-entered and changed.

Ex-works the device number is set according to the number on the name-plate, the customer number is set to "1" and the meter number to "2". The field "0" is automatically called after the entry or change of a number.



The changing of the meter or device number is treated like a new, first-time operation in the AWS-100 Evaluation Software. Old consumption data should therefore be read out first. In addition, for a change under "2" the user is asked whether a memory end marker (fixed I/O mark, see explanation of index number B8 below in this section) is to be written in order to clearly limit the data. Later readout stops at this point and it can only be skipped by a complete readout (memory dump, index number "777").



The values for the customer, meter and device numbers are in principle freely adjustable, but the following must be noted:

- 1) Entering a customer number of "0" results in the AS-200/S2 not reading out this channel in the automatic readout mode (see explanation of ref. code "333").
- 2) All device numbers of the individual channels must be different, so that the evaluation software can differentiate between the channels. For this purpose, the 5th position from the right is normally the channel number (1-4) of the DS-function as set ex-works.

"7" Set cp and cpz values

In the data structure the cpz value is the pulse value of the meter (gas, electricity or water meter) and the cp value is the actual data cp value for the stored data. The cpz value is not though bound to decade values as is the data cp value. The range of validity can be taken from the description of the relevant data storage device. In order to obtain an optimal data resolution, the decimal point of the prescaler can be offset by two places to the left or right, but it must be appropriately corrected by the data cp value (which has no influence on the storage of the data as conversion factor). Further information can be taken from the operating manual for the corresponding data storage device.

The cp and cpz values or just one of the two values can be set after entering the ref. no. "7". Setting the cpz value only functions if the DS-100 Data Storage Device offers this option (depends on device type).

The setting is made via two displays separately. First the cpz value is processed (see Fig. "7"-1) and then the cp value. The current value in the DS-100 is displayed behind "Curr.:" (e.g. the cpz value in Fig. "7"-1 is not activated) and the new entry is made underneath. The range of the cpz value that can be entered here extends from 0.001

to 9999.999 and with some DS-100s in addition also from 10000 to 99999.99 (see DS-100 operating manual).

cpz value
(meter cp value)
Curr: inactive
New:

Fig. "7"-1

Data cp value
(0.01 to 100)
Curr: 1
New:

Fig. "7"-2

In Fig. "7"-2 the formation is basically the same as previously, but the value range here only includes the decade values 0.01, 0.1, 1, 10 and 100.

The relationships between the cp and cpz values are shown in the following table.

Normally, the entry is terminated with the \leftarrow - key to accept the value, i.e. the current value is transferred again even when no new value has been entered. Also here, the activation of the DS-100 occurs at the next full hour.

cpz value entry	cp value entry	cpz value sent	cp value sent	Meaning
CC	Value 2	No	Value 2	cpz value autom. switched off
0	Value 2	0	Value 2	cpz value switched off
1	Value 2	1	Value 2	cpz value not significant
Value 1	CC	Value1	No	cp value autom. computed
Value 1	Value 2	Value 1	Value 2	Manually set values
CC	CC	No	No	Values are not changed
Value 1: Value in range from 0.001-9999.999 or 10000.00-99999.99 Value 2: Value in range from 0.01-100 (decade) CC: Press ESC key twice				

Fig. "7"-3



Some data storage devices do not have the feature of being able to automatically compute the cp value, so the cp value must be entered separately here.

"8" Set the fixed I/O mark

This parameter sets a memory-end mark in the DS-100 (I/O mark "00"). When reading out an LIS-100 device (see Section 4.5.3), readout only takes place to the last set fixed I/O mark, giving a clear boundary to the data. This function is intended for when the location of the data storage device is changed. When changes are made under the index number "2" ('Enter code numbers in terminal device', see above), the user is asked whether the fixed I/O mark is to be set so that no name confusion or data conflicts occur.

The set I/O mark can be skipped by entering the index number "777" ('Memory dump', see explanation of index number B777 below).



The fixed I/O mark has no relationship to the variable I/O mark (see explanations on the index numbers "1117" and "222").

"10" Configure DS-100 devices

Apart from the actual data storage function, some DS-100 devices have various additional functions which can be configured with the AS-200/S2. The features depend on the DS-100 type and version and should be taken from the description of the relevant device.

The DS-100 must be already connected to the AS-200 before entering the index number "10". The current configuration can be interrogated in the basic menu, which appears after entering "10", with the key "3". The following illustrations describe the abbreviations which may be displayed by the AS-200.

Abbreviation	Meaning
Standard function	The DS-100 has not special function.
K3, K4=Status	Channel 3 or Channel 4 or both record the status.
HT/LT comb. tsync	Time synchronous line addition (combined).
HT/LT comb. dir.	Asynchronous line addition (combined).
HT/LT par. tsync	Time-synchronous, isolated lines (parallel).
HT/LT par. dir.	Synchronous, isolated lines (parallel).
Add. memory K4	Pulse-adding memory in Channel P-4.
Add. counter S1	Pulse-adding Channel S-1
E4 = Switching input	MAG4 input in DS-100/C becomes counter input.
Function not def.	Device configuration is not defined.

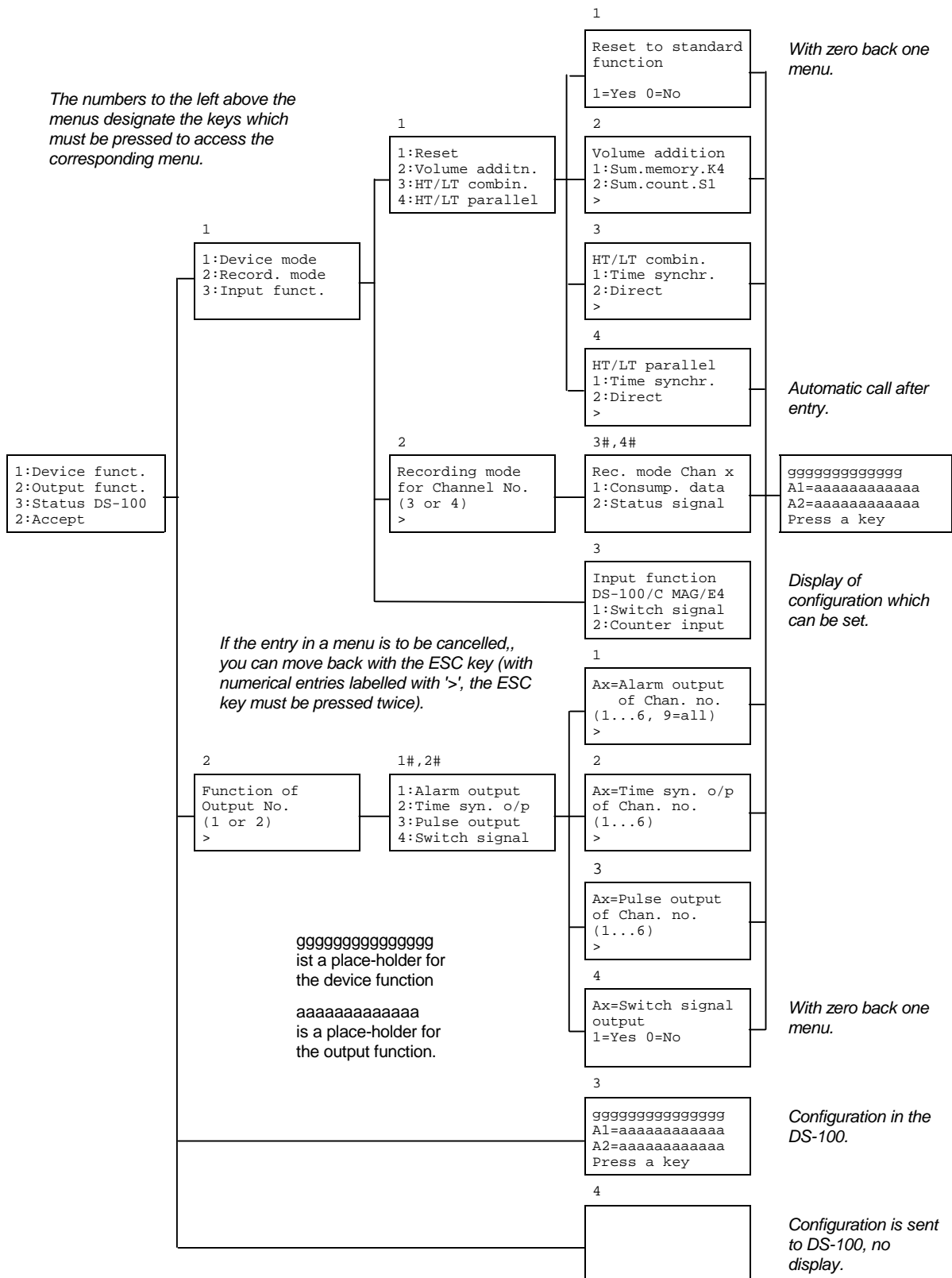
Fig. "10"-1 (Device functions).

Abbreviation	Meaning
Time-syn. hour	Time-synchronous output at hourly periods.
Time-syn. chan. x	Time-synchronous output at interval periods of Channel x (x=1..6).
Ala. out. chan. x	Alarm output of Channel x (x=1...6).
Pul. out. chan.x	Pulse output of Channel x (x=1...6).
Switch signal	Switching signal output/tariff output.
Ala. out. all chan.	Alarm output of all channels.
Output not def.	Output configuration is not defined.

Fig. "10"-2 (Output functions).

To accept the changes, the function **"4:Accept"** must be selected, or the program can be cancelled via the "ESC" key.

Fig. "10"-3: Overview of configuration.



"11" Set alarm limits

This point enables the setting of all alarm limits in the data storage device. The program consecutively processes all previously configured (adjusted) channels.

Activation and deactivation of the limits takes place under the index number "10", 'Configuration of DS-100 devices' (see above).

After entering the index number "11" the channel now to be processed (here "K:3" refers to the third channel) can be read in the title line of the display (see illustration below). The entry is made in two steps: First the type of limit ("1" for interval value or "2" for daily value), then the actual alarm value. The values set in the DS-100 are shown in brackets with the value referring to the current dimensional unit.

In the display the alarm value is shown in exponential notation with "E" for "the power of 10" for the following number (e.g. $234E1 = 234 \times 10^1 = 2340$ or $534E0 = 534 \times 10^0 = 534$). The exponent always depends on the cp value and is automatically matched to it. If, for example, an alarm limit of 2000 is set and the cp value is changed from 1 to 10, then a reduction in the alarm limit from 2000 to 200 takes place automatically. In contrast to the display, the entry of a new limit is made in normal decimal notation (see Fig. 11) with post-decimal places only being possible if a cp value ≥ 10 is set.

A-LIMIT K:3
Alarm: (PERIOD)
1:Period, 2:Day

Fig. "11"-1

A-LIMIT K:3
Alarm: (PERIOD)
Value: (000000E0)
=>

Fig. "11"-2

Key	Meaning
1	Alarm limit is referred to a measurement period
2	Alarm limit is referred to a day.
←	The old value is retained.
ESC	Moves to the next channel or quits the program.

Tab. "11"-1 (Entry for "11"-1)

Key	Meaning
0...9	Entry of the alarm limit in the relevant unit.
.	Decimal point.
←	Sends the alarm limit to the relevant channel.
ESC	Deletes value, moves to next channel or quits program.

Tab. "11"-2 (Entry for "11"-2)


"20" Set units


The command "Set units" is used to enter the valid unit in the DS-100, but it has no effect on the computations in the DS-100. This function is only present though in newer type devices.

After calling, the following appears for example:

```
UNIT (DS-100)
Curr: kWh
New:
0-9*F1,ESC,CR:
```


Fig. "20"-1

"Curr." indicates the present value set in the DS-100. If this value is to be changed, different text can be selected (default is cleared text) by pressing the keys "0" - "F1". The text displayed adjacent to "New" can be transferred to the terminal device by pressing the  - key. The program can be cancelled by pressing the "ESC" key.

Key	Function
0	Select cleared text.
1	Select text "m ³ "
2	Select text "m ³ (n)"
3	Select text "kWh"
4	Select text "MWh"
5	Select text "Degrees C"
6	Select text "K"
7	Select text "bar"
8	Select text "mbar"
9	Select text "MJ"
F1	Select text "GJ"
	Send data to DS-100 and finish
ESC	Terminate procedure

Tab. "20"-1

"21" Set day boundary

The start of the day in the DS-100 can be set after entering the index number "21". The time values that are possible can be taken from the current DS-100 specification (e.g. some devices only support hour values). The time is entered in hours and minutes format. Syntactically incorrect times result in a new entry being requested. The transfer of the day boundary is made using the  - key. The program can be cancelled using the "ESC" key.

```
DAY BOUNDARY
Curr: 00:00
=>
```

Fig. "21"-1

The label "Curr.:" indicates the currently valid value in the DS-100 and the entry field for the new value is directly under this.

"22" Set switching times

If your DS-100 is configured as a double-tariff device, then you will be interested in defining the individual switching times for the HT and LT times. Both times are requested consecutively and must be individually confirmed. This means that only one switching time can be changed once a value has been cancelled with the "ESC" key. The currently set value is shown next to "Curr.:" and the field for the new entry is below it.

```
SWITCHING TIME-HT
Curr: 00:00
=>
```

Fig. "22"-1

```
SWITCHING TIME-LT
Curr: 00:00
=>
```


Fig. "22"-2




The switchover can be switched off by entering invalid switching times. If, for example, the LT time and the HT time are set to the same values, the switchover is not in operation.

"222" Skip variable I/O mark during readout

Under the index number "222" the AS-200/S2 can be set such that, at the next readout in the "manual" readout mode, the variable I/O mark (see explanation of ref. no. "1117") is not taken into account. This means that if an I/O mark is found in the DS-100 which corresponds to that entered in the AS-200/S2, it is skipped.

 The variable I/O mark is only skipped during the next readout in the "manual" readout mode, i.e. the setting is only effective for one readout. (See also the explanation for ref. code "333".)

 The variable I/O mark has no relationship to the fixed I/O mark at which, apart from the memory dump, a stop always occurs (see explanations for the index numbers "8" and "777").

"333" Default setting for readout

In the "Default setting for readout" the mode of reading out DS-100 devices is defined. "Manual" is the standard default setting used in the AS-200. The other two modes are "interactive" and "automatic" (see Fig. "333"-1). The currently active mode is displayed in the second line in the AS-200 and marked in the third line by an arrow (→).

```

Read out mode
Mode: Manual
→man auto int
Keys 1-3, <CR>

```

Fig. "333"-1

The separate modes also have various attributes. The following three tables give an overview of the available readout modes (Tab. "333"-1), available attributes (Tab "333"-2) and their relationships (Tab. "333"-3):

Readout mode	Function
Manual	Only the set channel in the terminal device is read out.
Automatic.	Multi-channel devices are set to the 1st channel and then consecutive readout takes place.
Interactive	As for "automatic", but confirmation is requested each time a channel is read out.

Tab. "333"-1

Attributes	Meaning
Meter reading	The current mechanical counter reading is requested before each readout.
Customer number	All DS-100 devices and channels which have "0" entered as the customer number are not read out.
Message	Messages are output during the readout.

Tab. "333"-2

Attribute \ Mode	Meter reading input	Customer number request	Message output
Manual	Yes	No	Yes
Automatic	No	Yes	No
Interactive	Yes	No	No

Tab. "333"-3



If the "automatic" mode is selected, a multi-channel device is read out in one pass (without further interrogation). Exceptions to this are where errors occur and when the time correction needs confirmation.



A variable I/O mark can only be skipped in the "manual" mode.



The setting for the readout mode under the index number "333" affects both LIS-100 as well as LIS-200 terminal devices. It can also be carried out under the menu item "Settings - Readout - **Archive**" (see Section 4.4.5.2). However, it does **not** correspond to the setting which can be carried out under the menu item "Settings - Readout - **Readout mode**" (see Section 4.4.5). This only applies to LIS-200 terminal devices.

"444" Data transfer with parity

A data transfer between the AS-200/S2 and a terminal device (at present only: Z-90 - Electronic Counter Head) with parity can be set. It must then be set to "Even parity".



The parity must only be changed in conjunction with the Z-90. With all other links (volume correctors, DS-100 or evaluation station) it must remain set to "no parity".

"555" Entry of the access code in the AS-200/S2

As access code a number with up to 8 figures can be entered. The number entered here is sent to the connected data storage device as access identification during future data transfers. The access code is numerical and ex-works is set to "00000000" in the AS-200 and DS-100 and is therefore not activated.



A change of parameters in the DS-100 is only possible if the value entered here corresponds to the access code present in the data storage device. Reading out of the data is possible without the correct access code.



The access code should be noted separately, since it can only be interrogated via the AWS-100 Software.



The access code (combination) can also be entered under the menu item "Settings - Locks - Enter comb." (see Section 4.4.6.2).

"666" Changing the access code in the DS-100

If you need to enter or change the access code in the DS-100, then this is possible with entry of the old and new numbers. The figures are requested after entering "666". To be able to carry out this function, the "old" access code of the DS-100 must correspond to that saved in the AS-200/S2 (see explanation of ref. code "555").

"777" Memory dump

This function is intended for reading out the complete memory content of a channel. In the "normal case" readout takes place up to the 1st of the last month or, if the last readout is earlier than this, up to the 1st of the month in which the last readout occurred.

By entering "777" the displayed channel can be completely read out. Any set I/O marks are not taken into account here (variable as well as fixed I/O marks, see explanations on the index numbers "1117" and "8"). Then an evaluation of the readout data can be made.

The next channel is displayed by entering "0" in the menu and read out by confirming with "1". If all current channels have been displayed and none confirmed, you are returned to the main menu.

With a four-channel terminal device (e.g. DS-100/A or DS-100/V2) and a measurement interval of 60 minutes, the data from approximately the last six months can be read out with the memory dump. With a measurement interval of only 30 minutes the memory depth is then correspondingly only three months. With a single-channel DS-100/B terminal device with a measurement interval of 60 minutes, the data from the last two years can be read out.

"999" Set the date and time in the readout device

There are four ways of setting the date and time in the AS-200:

1. Via the menu item "Settings - General - Date/time" (see Section 4.4.4.1).
2. Via the index number B999.
3. Entry of the time in the BIOS (see Section 3.8.4).
4. Using the AWS-100 Evaluation Software in the module 'Data transmission' under the menu item: 'Set values in the AS-100' or WinLIS Software V1.2 or higher.

These methods of entry are intended as a supplement for when the device is used without the evaluation station. For the entry a comma "," is used as the separator for the date and time. The input has the following format:

DD,MM,YY ←↵ and hh,mm,ss ←↵ ,

where the numbers must, when applicable, be entered with leading zeroes.

Example:

01,07,99 ←↵ → 1st July 1999

15,08,30 ←↵ → 15:08:30

"1117" Set the variable I/O mark

The variable I/O mark in the AS-200/S2 can be set under the index number "1117". If its value is not equal to zero, it is written into the DS-100 memory after each readout. During the next readout, the AS-200/S2 stops the readout at this point if its internal I/O mark corresponds with that in the DS-100. If no I/O mark is found in the DS-100 which corresponds with that set in the AS-200/S2, the DS-100 memory is completely read out or up to any fixed I/O mark that is set (see explanation for index number B8).

Under the index number "222" the AS-200/S2 can be set such that at the next readout in the "manual" readout mode the variable I/O mark is skipped.

The variable I/O mark can take on values from 0 to 255.

If it is equal to zero, it is not taken into account, i.e. after the readout no I/O mark is set and also no variable I/O mark is sought in the data stream. The data memory is in this case read out up to the month boundary before the last readout.

With values from 1 to 127 it is set automatically in the DS-100 after the readout and for values from 128 to 255 only after confirmation by the user.



The variable I/O mark has no relationship to the fixed I/O mark at which, a stop always occurs (see explanation for the index numbers "8").



The variable I/O mark can also be set in the menu 'Settings - Readout - I/O mark (DS-100)'. It only affects the reading out of LIS-100 devices.

"8886" Skip AS-200 memory test

Under this index number you can set whether the data memory of the AS-200 is checked or not after the AS-200 has been switched on. If a large amount of data is saved in the memory, the check of the data memory may take some minutes.

```
Test
consumption
data at start?
1=Yes 0=No
```

This setting can also be carried out under the menu item "Settings - Memory- Skip test" (see Section 4.4.7.5).

"8887" AS-200 memory test

The individual RAM banks in the AS-200 can be checked for correct functioning. Two different patterns are written in the RAM, checked and then completely cleared from the memory.



This function should only be executed after transmission of the data to the evaluation station, since it leads to the deletion of all consumption data in the AS-200.

"8888" Clear the memory content in the AS-200

All the consumption data is deleted in the memory of the AS-200. This is necessary for example if the message "ERROR - DO NOT READ OUT ANY MORE DEVICES " appears after switching on. The consumption data cannot then be correctly read out by the evaluation software and must be deleted.



This function should only be carried out after transmitting the data to the evaluation station since it leads to deletion of all the consumption data in the AS-200.

4.5.3 Reading out LIS-100 devices

4.5.3.1 Readout modes

Three readout methods are available for reading out LIS-100 devices (DS-100/s, EK-8x, etc.).

- **Manual readout**

This readout method enables the targeted readout of single channels. Entry of the mechanical meter reading is possible here for checking purposes.



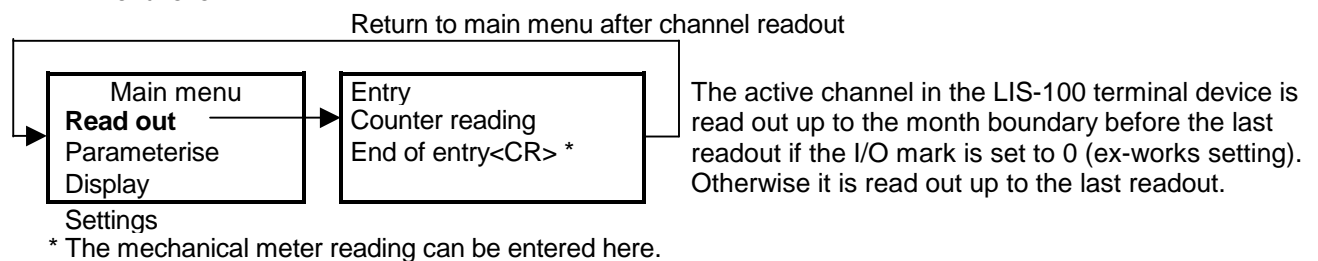
The channel to be read out must be set on the terminal device.

AS-200/S2 device settings for reading out in the "Manual" mode

Readout mode → Setting has no effect

Archives → Manual

1st menu level



- **Automatic readout**

This method enables the readout of all channels in one pass starting with Channel "1". Channels or devices with the customer number "0" are not read out here (skipped). Operation is restricted to a possible time correction or a case of error.

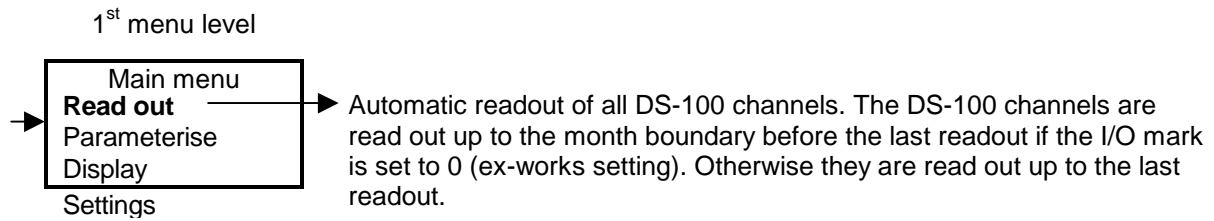


For terminal devices without channel identification (e.g. Z-90), the error message: "Error on opening" is output. If this type of terminal device is to be read out, the mode should be set to "manual" or "interactive".

AS-200/S2 device settings for reading out in the "Automatic" mode

Readout mode → Setting has no effect

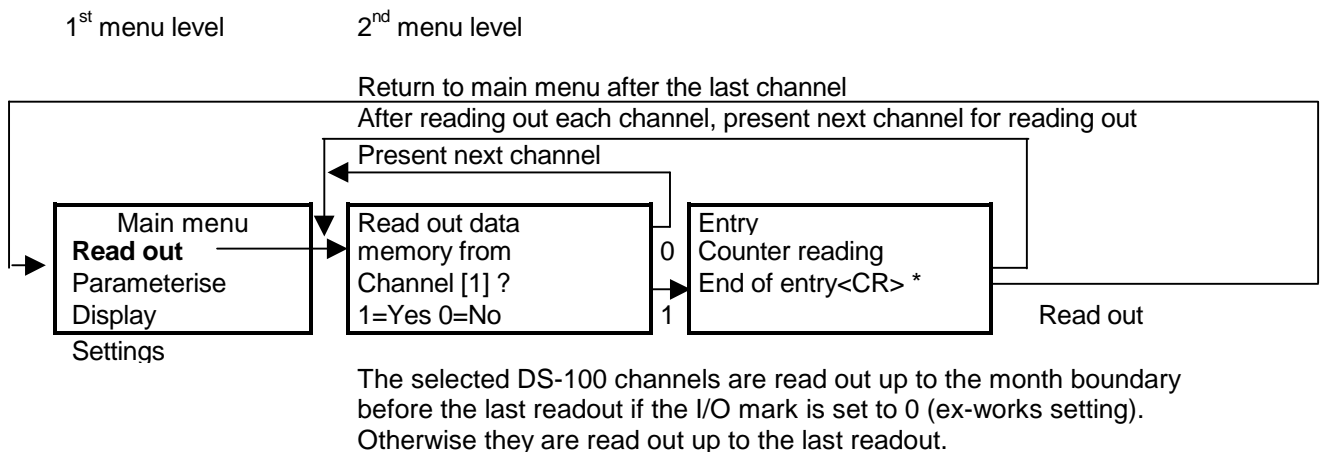
Archives → Automatic



• **Interactive readout**

Interactive readout operates similar to "Automatic readout" except that the reading for the adjustable counter can be entered before starting the readout and the readout of individual channels must be confirmed before starting. Here, a channel with the customer number "0" is also read out. This readout method is particularly intended for devices with a display which is not directly accessible.

AS-200/S2 device settings for reading out in the "Interactive" mode	
Readout mode	→ Setting has no effect
Archives	→ interactive



* The mechanical meter reading can be entered here.

The required readout method can be defined with the setting function "333" ("Default setting for readout"), see Section 4.5.2.6, explanation of the ref. code 333) or via the menu item "Settings - Readout - Archive" (see Section 4.4.5.2). It is retained, even after switching off the device, until the entry of a new method. During readout the current channel is shown in the AS-200 display as a check.

4.5.3.2 Starting the readout



Before starting the readout of volume correctors in which the so-called printer protocol or the output of process data can be activated, it must be ensured that these functions are switched off, because otherwise data collisions may occur (see the operating manual of the relevant volume corrector).

The data readout is started by selecting the menu item 'Readout' in the main menu. Then an automatic check is made of whether an LIS-100 device (DS-100 protocol) or

an LIS-200 device (IEC 1107 protocol) is connected. You can define in the AS-200 device settings for which device a check is first made (see Section 4.4.9).

With the readout method "manual" or "interactive" the entry of a meter reading is requested after the automatic detection of the DS-100 protocol. This can be entered with up to twelve places, of which a maximum of two can be post-decimal places (123456789012 or 1234567890.1 or 123456789.12).



With the use of the AWS-100 V3.10 Evaluation Software and lower versions, erroneous messages may occur during the processing of the data, e.g. "Device number changed by reader from <incorrect value> to <present device number>". This error can be rectified by an update of the readout software.

4.5.3.3 Time correction after the readout

After each readout process the time and date are automatically corrected if an inaccuracy lies within the limits specified for automatic correction (see Section 4.4.8). The reader does not notice this. If the inaccuracy is greater, but within the limits specified for manual correction (see Section 0), the time is corrected only after manual confirmation. Larger deviations are not corrected, because a device fault must be assumed. The storage device must then be checked.

In the AS-200/S2 the limits for automatic time correction are set ex-works to +/- 5 minutes and to +/- 30 minutes for manual correction.



To avoid an incorrect time being set in the terminal device, it is advisable with a new AS-200/S2 to check the time in the AS-200/S2 before the first readout (see Section 4.4.4).



With approved tariff devices the time correction is restricted to once per day and a maximum of +/- 20 sec if the calibration switch is closed. If the deviation is greater, the correction can only be carried out by opening the calibration switch.



It must also be noted that the time cannot be corrected backwards beyond an interval boundary. In this case the time is only "approximated", i.e. it is set to the interval boundary.

Example:

If the current time is 09:58 hrs and the time in the data storage device is 10:02 hrs, the time is set back to only 10:00 hrs after a readout. A remedy here is to wait beyond the interval boundary (here 10:00 hrs) and then readout or set the values again.

The data transfer from the storage device is completely independent of the time correction, i.e. the data is always transferred.

4.5.3.4 Memory dump

The so-called "Memory dump" (index number B777) is available for reading out the complete memory content (see Section 4.5.2.6, explanation of the function B777).

4.5.4 Displaying LIS-100 management information

Management information is the device number and the device designation of the terminal devices already read in. Here, the devices of both systems (LIS-100 and LIS-200) are supported.

The management information is displayed when the menu item 'Display' is selected in the main menu (see also page 71, Section 4.6.4, "Displaying LIS-200 management information").

4.6 Working with LIS-200 devices

4.6.1 General remarks on data transmission with LIS-200 devices

In contrast to data transmission with LIS-100 terminal devices with which the Elster-specific DS-100 protocol was used for earlier AS-200 versions, with LIS-200 terminal devices the IEC 1107 protocol is used for the data transmission. Since the IEC 1107 protocol is defined by an international standard independent of any manufacturer, the use of this protocol has the advantage that all terminal devices with an interface conforming to this standard can be read out with the AS-200/S2.

4.6.2 Parameterising LIS-200 devices

4.6.2.1 General remarks on parameterisation

With the AS-200/S2 only the most important parameters of an LIS-200 terminal device can be set. An overview of the values that can be parameterised can be found in Section 4.6.2.2 on page 61. The values which can in total be parameterised in an LIS-200 terminal device can be taken from the documentation of the relevant terminal device.

With the Elster DL240 Data Logger the documentation consists of the operating manual and the programming manual (applications manual). In the operating manual all parameters are listed which can be set, but not the values which the parameters must assume to fulfil a certain application. These are listed in the programming manual.



The programming manual gives information about which parameters must be set with which values so that the DL240 fulfils a certain task (a certain application).

You must first select the menu item 'Parameterise' in the main menu to be able to parameterise a terminal device. Then the AS-200/S2 starts the device detection, i.e. it checks whether an LIS-100 or an LIS-200 terminal device is connected. This is necessary because the devices of both of these device generations are addressed with different protocols (see Section 4.4.9, page 33).

When an LIS-200 terminal device has been detected, the submenu 'Parameterise' appears with the three menu items 'Device', 'Inputs' and 'Outputs'.

After selecting a menu item and before entering the new values for the individual parameters, the values currently stored in the terminal device as well as their data type, data format and any value ranges are loaded. The current values are displayed as default values during the following entry. The data types, formats and the value ranges enable the AS-200/S2 application software to detect and so prevent invalid entries for parameters. **The term 'invalid' here, of course, only refers to the format**

and the value range; the software cannot detect entries in which the content is incorrect.

The parameters, which are combined under one menu item (see Section 4.6.2.2), are first entered consecutively. If a displayed default value is not to be changed, the entry can be skipped with the \leftarrow - key. After entry or skipping of the last value, a query appears on the AS-200/S2 display asking whether the data just entered is to be sent to the terminal device:

```
Transfer
entered
data?
<  $\leftarrow$  >Yes , <ESC>No
```

Once the entry is terminated with the \leftarrow - key, the values are set. During the setting process which may take some seconds, the text 'Values are being set' is shown in the AS-200/S2 display. Then the program automatically returns to the menu 'Parameterise'.

If the query is acknowledged with the ESC key, you are returned to the menu 'Parameterise' without values being set in the terminal device.

The parameterising of terminal devices can be blocked or released via the AS-200/S2 device setting 'Parameterise' (see Section 4.4.4.3, page 27).

4.6.2.2 Overview of the parameterisable values

Menu item 'Device data'		Menu item 'Inputs'		Menu item 'Outputs'	
Device number	C	Input designation	U	Output designation	U
Device name	C	Cp value	C	Mode (selection mode)	U
Day boundary	C	Meter number	U	Assignment	U
		Meter reading	U	Cp value	U
		Measuring point number	U	Pulse value	U
		Measuring point name	U		
		Customer number	U		
		DS-100 designation (HT)	U		
		DS-100 designation (NT)	U		
		Measurement period	C		
		Units	U		

"U" means subject to user lock and "C" means subject to calibration lock.



The values listed above may deviate slightly depending on the LIS-200 terminal device. With the EK260, for example, no DS-100 number can be entered. In addition, the pulse value cannot be entered with the DL240 nor with the EK260 when parameterising an output.

4.6.2.3 Parameterising the device data

You first select the menu item 'Device' in the menu 'Parameterise' to parameterise the device data. Then you enter the device number and the device name. The device number can be entered with a max. of 12 numerical places (numbers 0...9). Leading zeroes do not need to be entered. The device name has eight alphanumeric places (numbers 0...9, letters A-Z). Letters can be entered in the character mode with the aid of the SHIFT key (see Section 4.3.4 on page 23).

4.6.2.4 Parameterising the inputs

After selecting the menu item 'Inputs' in the menu 'Parameterise', the inputs of a terminal device can be parameterised. First, you can define the input channel to be parameterised with the NEXT key:

```
Parameterise
Select Input
1:Input 1
1..4 <NEXT>
```

After selecting an input, the current values set in the terminal device for this input are read, so that they can be displayed as default values during the entry of the new values. Since this may take some seconds, the text 'Autom. detection' is shown in the AS-200/S2 display. The following values can now be entered consecutively:

Parameter	Format
Input designation	Alphanumeric (0...9, A-Z), max. 12 places.
Cp value	Numerical, 0.001...99999.999, no. of pre-DPs ¹ and post-DPs ² depends on the terminal device.
Meter number	Numerical, max. 12 places.
Adjustable counter	Numerical, max. 13 places, no. of post-DPs ² 0...4, depends on cp value: <ul style="list-style-type: none"> • cp value<=1: 13 pre-DPs¹, 0 post-DPs² • cp value=10: 12 pre-DPs¹, 1 post-DP² • cp value=100: 11 pre-DPs¹, 2 post-DPs² • cp value=1000: 10 pre-DPs¹, 3 post-DPs² • cp value=10000: 9 pre-DPs¹, 4 post-DPs²

¹ pre-DP=predecimal place

² post-DP=post-decimal place

Measuring point number	Numerical, max. 12 places.
Measuring point name	Alphanumeric (0...9, A-Z), max. 12 places.
Customer number	Numerical, max. 12 places.
DS-100 number (HT)	Numerical, max. 8 places ⁽¹⁾
DS-100 number (NT)	Numerical, max. 8 places ⁽¹⁾
Measurement period	Numerical, max. 12 places
Units	m3

(1) Ex-works setting of the DS-100 designation for the four inputs on the DL240: DL240 device number in which the 6th place from the right is numbered 1 to 8 as follows:

DS-100 number (HT), Input 1:	311xxxx
DS-100 number (LT), Input 1:	321xxxx
DS-100 number (HT), Input 2:	331xxxx
DS-100 number (LT), Input 2:	341xxxx
DS-100 number (HT), Input 3:	351xxxx
DS-100 number (LT), Input 3:	361xxxx
DS-100 number (HT), Input 4:	371xxxx
DS-100 number (LT), Input 4:	381xxxx



With the EK260 only Input 1 can be parameterised with the AS-200/S2. With this V is measured and V_b derived. The Inputs 2 (comparison input) and 3 (signalling input) can only be parameterised in the ex-works setting and with WinPADS from at least V2.0.

Additionally, with the EK260 no DS-100 number can be entered with the AS-200/S2. This is set with the ex-works setting and normally does not need to be changed. If it does need to be changed, you can use the readout and parameterising software WinPADS from at least V2.0.

4.6.2.5 Entry of meter data without a connected terminal device

If the terminal device is installed spatially separate from the meter, the meter data, cp value, meter number and adjustable counter reading can be read on the meter and directly entered into the AS-200/S2. The values no longer need to be noted on paper. Then you go to the terminal device with the switched on AS-200/S2 to set the values. The procedure is identical with LIS-100 and LIS-200 terminal devices. A detailed description of the procedure can be found in Section 4.5.2.3 on page 38.

4.6.2.6 Parameterising the outputs

After selecting the menu item 'Outputs' in the menu 'Parameterise', the outputs of a terminal device can be parameterised. Similar to parameterising the inputs (see above), you can define the output channel to be parameterised with the NEXT key.

After selecting an output, the current values set in the terminal device for this output are read, so that they can be displayed as default values during the entry of the new

values. Since this may take some seconds, the text 'Autom. detection' is shown in the AS-200/S2 display. The following values can now be entered consecutively:

Parameter	Format
Output designation	Alphanumeric (0...9, A-Z), max. 12 places.
Mode	Discrete values 1,2,3,4,6,7,8,9 with the following meaning: <ul style="list-style-type: none"> • 1: Pulse output (output conducting during a pulse). • 2: Status output (Status 'active'=Output conducting). • 3: Time-synchronised output. • 4: Output switched on (conducting). • 6: Status output inverted (Status 'active'=Output blocking). • 7: Output switched off (blocking). • 8: Analogue output 0...20mA. • 9: Analogue output 4...20mA.
Assignment (source)	Source address in format [ii:aaaa] with: <ul style="list-style-type: none"> • ii=Instance (00...99). • aaaa=Address (0100:0C0D) The address or, if present, the designation of the current source is displayed, e.g. '01:203' or 'Vx.P' for the adjustable totaliser.
Cp value	Decimal, 2 post-decimal places (post-DPs).
Pulse value	Decimal, 2 post-DPs (always=1 for DL240, i.e. not parameterisable)

4.6.2.7 Parameterising the archives

With the AS-200/S2 the readout note "Readout time period" in the LIS-200 terminal device can be separately set for each party to access (supplier and customer). Based on this readout note, an AS-200/S2 detects on reading out in the "Automatic" mode (see Section 4.6.3.2) whether it is to read out the relevant archive and, if so, over which time period.

After selecting the menu point 'Archive' in the menu 'Parameterise' you can parameterise the archives of an LIS-200 terminal device. First, as when parameterising the inputs and outputs (see above), you can determine the archive to be parameterised with the NEXT key. With the DL240, for example, ten archives are presented for selection (with the EK260 there are six archives 1..6). After selecting an archive you can enter the required readout time period.

```

Param. archive
Select archive ?
1:Archive 1
1..10 <NEXT>
    
```

```

Param. archive
R/O time per.:
3:Prev. mth to
today
0 1 <NEXT>
    
```


In the ex-works setting for the terminal devices the readout time period for all archives is set to "Previous month till today".

The following values can be set:

- 0 Do not read out
- 1 Up to the last readout
- 2 Previous month
- 3 Previous month till today
- 4 Complete



The readout note "Readout time period" is separately saved in an LIS-2000 terminal device (e.g. DL240, EK260) for each archive and is taken into account **only with the "Automatic" readout mode** (see Section 4.6.3.2).

For the **"Preset" readout mode** (see Section 4.6.3.4) the readout time period can be set in the menu "Settings - Readout - Time period" (see Section 4.4.5.3). It is saved in the AS-200/S2 and applies to all archives.

In the **"Manual" readout mode** (see Section 4.6.3.5) the readout time period must be entered manually each time before an archive is read out.

The readout time period normally only affects LIS-200 terminal devices (DL240, EK260), not LIS-100 terminal devices (DS-100, EK-8x).

4.6.2.8 Time correction after parameterisation

After the parameterisation of an LIS-200 terminal device any timekeeping inaccuracy of the clock in the terminal device is corrected by the AS-200/S2 in dependence of the set limits (see Section 4.4.8).

Correction of the time in an LIS-200 terminal device occurs basically as for the time correction in an LIS-100 terminal device (see Section 4.5.3.3). Only the restriction regarding the correction backwards through a measurement interval boundary does not apply to LIS-200 terminal devices.



To avoid an incorrect time being set in the terminal device, it is advisable with a new AS-200/S2 to check the time in the AS-200/S2 before the first readout (see Section 4.4.4).

4.6.3 Reading out LIS-200 devices

4.6.3.1 General remarks on reading out LIS-200 devices

LIS-200 terminal devices (e.g. DL240, EK260) can be read out in three different modes:

- Automatic

- Preset
- Manual

The mode to be used can be set in the AS-200/S2 (see Section 4.4.5).

Reading out is started by selecting the menu item 'Readout' in the main menu.

During the readout of an archive, the current status is always displayed in the form [xxxx] from [yyyy] where xxxx = Number of the data record which is at the moment being read and yyyy = Number of the data records which are being read from the archive.

The readout can be interrupted with the ESC key. Cancellation must be confirmed within about two seconds with the ↵ key, otherwise the readout continues. Only the reading out of the archive data records can be interrupted (when the data record counter [xxxx] from [yyyy] is incrementing), but not the readout of the general archive data and the descriptive data which is read at the start of each archive readout.

From Version 8.1 of the AS-200/S2 software the user lock of an LIS-200 terminal device (e.g. DL240, EK260) is closed again after the readout (provided it was closed before the readout).

4.6.3.2 Entering the counter reading of the mechanical meter

Before reading out a measurement period archive, the counter reading of the mechanical meter can be entered provided the entry has previously been released in the menu "Settings - Readout - Mech. meter rdg." (see Section 4.4.5.5).

The mech. meter reading can be compared with the adjustable counter reading of the terminal device for control purposes in the evaluation program (WinLIS or AWS-100). This is of course only practicable if the adjustable counter is set to the reading of the mechanical meter.

If the entry is released, you can enter the mech. meter reading in dependence of the settings "Readout mode" (see Section 4.4.5) and "Archives to be read out" (see Section 4.4.5.2):

Setting		Entry of the mech. meter reading possible
Readout mode	Archives	
Automatic	Any	No
Preset	Automatic	No
	Interactive	Yes
	Manual	Yes
Manual	Any	Yes

The mech. meter reading can be entered with a maximum of 12 figures. Of these, two may be post-decimal places.

4.6.3.3 Reading out in the 'automatic' mode

In the 'automatic' readout mode all archives for the terminal device are automatically read out in line with the readout notes programmed in the terminal device.

The readout notes are defined in the terminal device separately for each archive and for both parties to access, "Supplier" and "Customer". The readout notes are set by the terminal device ex-works settings such that all archives of the terminal device are read out up to the start of the previous month.

The readout notes contain the following information:

- **Code for readout mode time period:**
 - 0 Do not read out
 - 1 Back to the last readout
 - 2 Previous month
 - 3 Previous month up to today (ex-works setting)**
 - 4 Complete archive
- Position of the note value in the archive data record: Pointer to the column of the archive in which the note value is to be sought. Set as standard to '1', corresponding to the **position of the column with the global block numbers**.
- Note value: Value from which the archive data records are to be read. As standard, the **global block number of the last data set read out**.
- Note text: **Name of the reader** from the AS-200/S2.

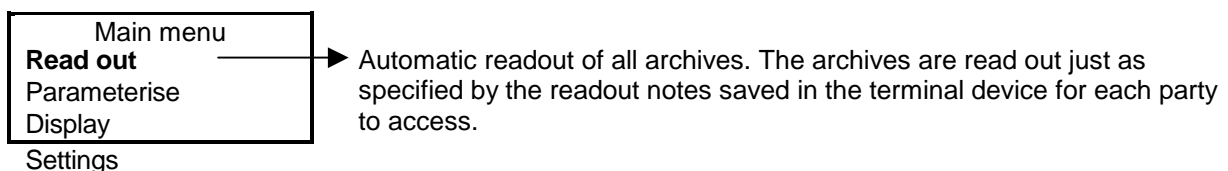
The AS-200/S2 device setting 'Archive to be read out' (see Section 4.4.5.2) has no effect in the 'automatic' readout mode.

The readout note "Readout time period" can be set separately for each archive via the menu point "Parameterise - Archives" with the AS-200/S2 in the LIS-200 terminal device (see Section 4.4.5.5).

AS-200/S2 device settings for reading out in the "Automatic" mode

Readout mode	→ Automatic
Archives	→ Setting has no effect

1st menu level



If the readout note is set to the value 0 for at least one archive (= "Do not read out"), then the message "Not all archives can be read out according to readout notes. Press a key" appears before the start of the automatic readout.

4.6.3.4 Reading out in the 'preset' mode

In the 'preset' readout mode the archives are read out according to the AS-200/S2 device setting 'Readout time period' (see Section 4.4.5.3). Whether all archives can be automatically read in this way or whether the reader can manually determine the archive to be read out, depends on the AS-200/S2 device setting 'Archives to be read out' (see Section 4.4.5.2).

- With the 'automatic' setting all archives are read out automatically according to the AS-200/S2 device setting 'Readout time period' (see Section 4.4.5.3).
- With one of the settings 'manual' or 'interactive' the archive to be read out can be manually determined by the reader. The selected archive is then also read out according to the AS-200/S2 device setting 'Readout time period'.


The settings 'manual' and 'interactive' do not differ in the reading out of LIS-200 devices. With both modes the request for entry of the archive to be read out appears after selection of the menu item 'Readout' in the AS-200/S2 display.

```

Read out
Select archive?
1: Archive 1
1...8 <NEXT>
```

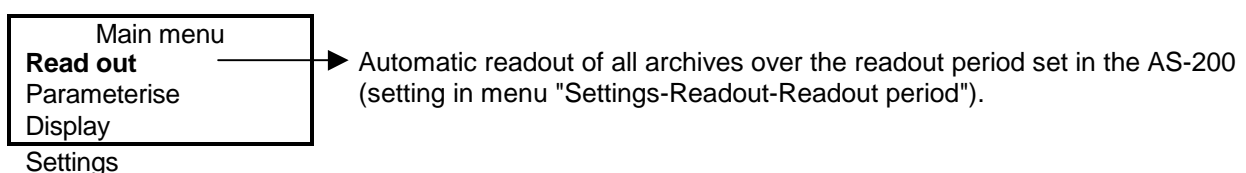
After selecting an archive it is then read out according to the AS-200/S2 device setting 'Readout time period'.

The settings 'manual' and 'interactive' only differ for reading out LIS-100 devices (DS-100/s, EK-8x, etc.). They are identical to the corresponding settings which can be made under the index number B333 (see Section 4.5.2.6, Explanation of index number B333).

 The setting 'Archives to be read out' (menu 'Settings - Readout - Archive') is identical to the setting function B333. Consequently, it affects the reading out of both LIS-100 and LIS-200 terminal devices.

AS-200/S2 device settings for reading out all archives in the "Preset" mode	
Readout mode	→ Preset
Archives	→ Automatic

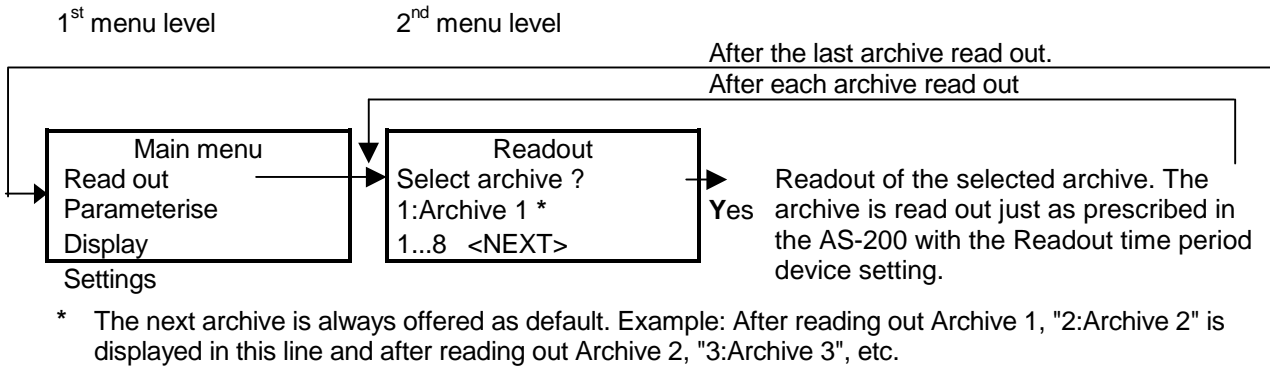
1st menu level



AS-200/S2 device settings for reading out **certain** archives in the "Preset" mode

Readout mode → **Preset**

Archives → **Manual or interactive**



4.6.3.5 Reading out in the 'manual' mode

As in the 'preset' mode, the archive to be read out can be selected in the 'manual' readout mode.

```

Read out
Select archive?
1: Archive 1
1...8 <NEXT>
    
```

In contrast to the 'preset' mode you can, in the 'manual' mode after selecting an archive, enter the time period from which data is to be read out of the archive:

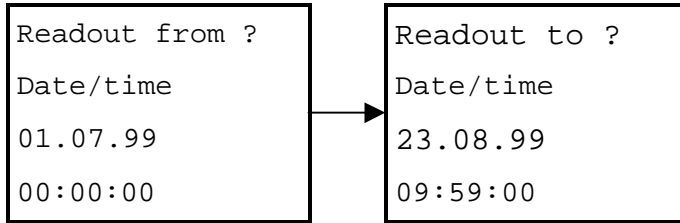
```

Read out
Time period
1: Last readout
1...8 <NEXT>
    
```

Here, five entries are possible:

- 1: Last readout (back to the time of the last readout).
- 2: Previous month.
- 3: Prev. month to today (previous month up to the current time).
- 4: Complete (complete archive)
- 5: Entered period (time period entered manually)

After selecting option 5 'Entered period' the following illustrated entry windows are shown consecutively in the display.



The date and time for the times "Readout from" and "Readout to" are entered consecutively. Each entry is terminated with the **↵** - key.

The separators "." and ":" need not be entered. They are automatically inserted.

The entries are checked for erroneous content (e.g. month > 12).

If the entries "from" and "to" are (chronologically) interchanged, this is automatically corrected during the formation of the readout command.

It is not essential to enter seconds. If no seconds are entered, then they are simply set to 00.

As a default setting, the current date with time set to 0:00:00 hrs is used for "to" and the 1st of the last month at 00:00:00 hrs for "from".

If, after entering the date, the **↵** - key is pressed again without entering a time, then the time is taken as 00:00:00.

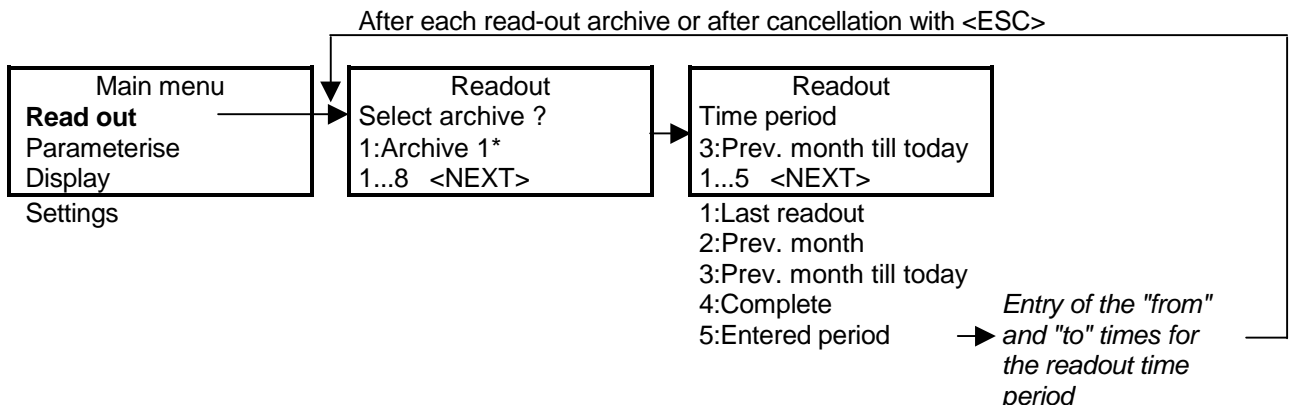
AS-200/S2 device settings for reading out in the "Manual" mode	
Readout mode	→ Manual
Archives	→ Setting has no effect

1st menu level

2nd menu level

3rd menu level

4th menu level



* The next archive is always offered as default. Example: After reading out Archive 1, "2:Archive 2" is displayed in this line and after reading out Archive 2, "3:Archive 3", etc.

4.6.3.6 Time correction after the readout

After the readout any timekeeping inaccuracy of the clock in the terminal device is corrected by the AS-200/S2 in dependence of the set limits (see Section 4.4.8).

Correction of the time in an LIS-200 terminal device occurs basically as for the time correction in an LIS-100 terminal device (see Section 4.5.3.3). Only the restriction regarding the correction backwards through a measurement interval boundary does not apply to LIS-200 terminal devices.



To avoid an incorrect time being set in the terminal device, it is advisable with a new AS-200/S2 to check the time in the AS-200/S2 before the first readout (see Section 4.4.4).

4.6.4 Displaying management information

Management information is the device number and the device designation of the terminal devices already read in. Here, the devices of both systems (LIS-100 and LIS-200) are supported.

The management information is displayed when the menu item 'Display' is selected in the main menu.

If more than two terminal devices have already been read out, then the first column of the display indicates with the symbols '▲' and '▼' that you can page the display using the keys '↓' and '↑', i.e. you can show the device designation and number of other terminal devices which have already been read out.

Example:

▲ DL240
88235400959
EK-87
▼ 1210456

During the display of the management information paging two lines forwards, resp. backwards can always be achieved with the keys (↓ or ↑), i.e. the information of 'device number' and 'device designation' is always shown together. Incorrect interpretation is therefore not possible.

4.7 Data transmission to the evaluation station

The AS-200/S2 switches automatically to the data transmission mode when a character is received from the evaluation computer. You prepare for the transmission by connecting the transmission lead supplied with the evaluation software (AWS-100 or WinLIS) to the PC (secure the lead at both ends using the screws) and then switch

on the AS-200. The data transmission can be started on the PC when the main menu is shown in the AS-200/S2 display.

The remaining operation is carried out by the evaluation software (see operating manual for the AWS-100 or the WinLIS).

The data transferred to the PC is then automatically deleted in the AS-200/S2. The AS-200/S2 is then available once more for reading out terminal devices.



The meter reading which can be manually entered during the manual and interactive readout of LIS-100 devices has been extended from 8 to 12 places. This extension can be processed with the AWS-100 Evaluation Software from Version 3.5 onwards

or
with the WinLIS.

With evaluation with older AWS-100 versions no meaningful values are produced.



Here it should be noted that through an interruption in the link between the AS-200 and the evaluation station, the data transmission mode is retained and the AS-200 can only be reset again by a timeout after about 2 minutes. **Therefore the connecting lead should be screwed!**

The AWS-100 Evaluation Software and the WinLIS V1.x use the so-called "AS-Protocol" for reading out an AS-200/S2. Only data from LIS-100 terminal device can be read out with this protocol.

If data from LIS-200 terminal devices (e.g. DL240, EK260) is also saved in the AS-200/S2, then WinLIS from V1.2 onwards must be used for the transfer to the PC. From this version the so-called "XAP protocol" is used (extended AS protocol).

It is expected that from Version 2.0 the WinLIS will read the archive data, which has previously been read out of LIS-200 terminal devices (e.g. DL240, EK260) by the AS-200/S2, from the AS-200/S2 in IEC 1107 format. This is also automatically detected and supported by the AS-200/S2.

4.8 Special functions

4.8.1 Timeout

This function contains time monitoring of the interface to the connected terminal device. If no further data transfer takes place during a transmission, the transmission is cancelled after a certain time (timeout) depending on the relevant transmission protocol. Thereafter, the work can continue normally again. The data already read in is deleted again in the AS-200 memory or, if completely read in, correctly terminated. For a "timeout" message the readout process should be repeated just to be certain.

The management information can be used (see Section 4.6.4) to check whether the device has been successfully read out.

When reading out LIS-100 terminal devices, the data transmission is terminated after about 10 seconds without data transfer.

When reading out LIS-200 terminal devices, a waiting period of about 2 seconds is allowed for a response telegram. If the AS-200/S2 does not receive any response telegram in this time, the data transmission is cancelled (IEC 1107 protocol error). After receiving a response telegram from an LIS-200 terminal device, the AS-200/S2 can take about 2 minutes to send the next command to the terminal device, otherwise the IEC 1107 protocol is also terminated and operation returns to the main menu.

4.8.2 Reading out after a voltage failure

After a voltage failure (batteries discharged) it is possible, once the batteries have been replaced, to read out again (the data from the last readout process is however deleted, i.e. the last readout process must be repeated). The number of data storage devices or channels that have already been read in is shown in the display after switch on.

4.8.3 Error information

Transmission errors or incorrect entries are acknowledged by appropriate messages. Differentiation is made between two cases:

- Command [xx] unknown.
- Command [xx] not executable.

An "unknown command" is then displayed when, during setting values, a command is to be executed which is not understood or supported by the relevant terminal device.

The message "Command [xx] not executable" indicates that an invalid value has been entered. This may occur, for example, if a cp value is entered with the new volume correctors. From Version V3.0 this is no longer possible, since this version operates with the "genuine counter reading" of the volume corrector and also accepts its cp value.

The command that has not been understood or executed is displayed in hexadecimal form and its significance is explained in more detail in the Section 'Fault rectification'.

4.9 Fault rectification

In the following the most important error messages are explained which can occur during AS-200 operation. This is intended to simplify the recognition and rectification of operational faults. These are usually of only a trivial nature and although they have a pronounced effect, they are mostly easy to rectify.



After putting the DS-100 into operation a message appears indicating that the solder pad for the activation of the battery backup in the DS-100 should be connected.

If problems occur during the read-out or setting of older DS-100 devices (year of manufacture around 1988 and earlier) in combination with new read-out devices, technical support can be obtained from ELSTER Produktion GmbH.

4.9.1 Device/system errors

Error	Possible causes	Rectification
The AS-200 cannot be switched on	Rechargeable batteries discharged.	Insert new batteries.
	AS-200 defective.	Return the device.
After switch-on: "Restart, finding memory limit"	- Batteries + backup battery are discharged - AS-200 restart	Check batteries; clear memory and check again, otherwise return device.
After switch-on: "Do not read out any more devices"	Memory full (always after a restart)	- read out device with AWS-100 or WinLIS and delete memory - Delete memory manually with "B8888"
After each switch-on: "Do not read out any more devices"	AS-200 defective.	Return the device.
Message: "Please connect DS-100"	- loose connector on AS-200	Check connector for firm seating (secure!)
	Possible bent pin on connector.	Check pins and straighten.
	Lead broken	Test new lead and return defective lead.
Message: "TIMEOUT No further transmission"	loose connector on DS-100 or EK-8x	Check connector for firm seating (Secure with screws)
	Transmission with parity	Switch off parity with "B444" (only with Z-90)
	Possible bent pin on connector.	Check pins and straighten.
	Lead broken	Test new lead and return defective lead.
	DS-100 device	Test functioning. If OK, test again; return device if necessary.
Message: "Error on opening"	Comms. cannot be established.	Switch off AS-200 after unsuccessful repetition, remove both connections and repeat procedure.
	AS-200 defective.	Return AS-200.
ELSTER Handel GmbH		75

Error	Possible causes	Rectification
	Data storage device defective.	Return the data storage device.
Message: "Time difference too large" (Deviation >30 min.)	Date/time in AS-200 incorrect.	Check current date/time via menu 'Settings - General', (no daylight saving!).
	Date/time in DS-100 incorrect.	Check current date/time.
Message on reading out: "Access code incorrect"	The access code in data storage device is different to that in AS-200.	Set access code in AS-200 correctly via B555.

4.9.2 Operating errors

ERROR	Possible causes
MESSAGE: "Command [xx] unknown"	An attempt was made to execute a command which is not supported by the storage device. The command must not be executed (skip with "ESC" or " ← " command where multiple entries are made)
"53 - Set cpz value"	The cpz value is not supported by EK-8x's and some DS-100s (see corresp. oper. man. for terminal device).
"5B - Set configuration"	No configuration can be set for volume correctors.
"5F - Set unit"	This function is not implemented with various DS-100s and all EK-8x's.
"66 - Set name of current reader"	The reader's name must not contain any umlauts (ä, ö, ü, ß).
"6F - Set cp value"	The entry of a cp value is not possible in the analogue channels of the volume correctors.
"75 - Set adjustable counter"	With the EK-87/88 from Version 3.0 the adjustable counter corresponds to the genuine meter reading on the volume corrector and cannot be freely set.
MESSAGE: "Command [xx] not executable"	An attempt was made to transfer invalid data to a storage device.
"52 - Read meter cp value"	No longer possible with EK-87/88 from Version 3.0 (analogue channel).
"5D - Set day boundary"	With volume converters the day boundary can only be entered in full hours.
"6F - Set cp value"	With EK-87/88 from Version 3.0 the cp value can only be set to the cp value set in the volume corrector.
"71 - Set interval"	With some DS/EK devices not all possible interval periods can be set (see oper. man. for the relevant storage device).
"7E - Set the I/O mark"	With the EK-87/88 up to and incl. Version 2.7 it is not possible to set an I/O mark.

Information about messages that are not listed can be obtained from ELSTER Produktion GmbH.

Appendix

Manufacturer's Declaration for Ex Zone 2 (Translation)

Manufacturer's Declaration

(according to VDE 0165 of Feb. '91, item 6.3.10).


The Elster Readout Device, Type


AS-200

is suitable according to VDE 0165

for use in Zone 2 for gases in the temperature class T4,
ignition temperature > 135° C, e.g. ethyl ether.

(Take note of appendix)


- Elektronik -
- Systeme -
O. Pfaff


- Elektronik -
- Systeme -
J. Landvogt

Mainz-Kastel, 26th March 1997

Relevant directives, guidelines and standards:

- Directive on electrical systems in areas subject to explosion hazard (ElexV) of 27th Feb. 1980 (BGBl. 1 S. 214)
- Explosion protection guidelines (EX-RL) with set of examples, issued Sept. '90
- VDE 0165, issued Feb. '91

ELSTER 

Elster Produktion GmbH, Steinernstraße 19, D-55252 Mainz-Kastel
Telephone: +49-6134-605-0, Telefax: +49-6134-605-390, Telex: 6 134 915

Appendix to the Manufacturer's Declaration for Elster AS-200 Readout Device

Page 1 of 2

1. General

The measures that are necessary to avoid hazards due to areas that are subject to the risk of explosion are defined in standards, directives and guidelines.

The "Explosionsschutz-Richtlinien (EX-RL)" [Explosion Protection Guidelines], issued Sept. '90 by the Berufsgenossenschaft der chemischen Industrie give comprehensive information regarding the measures which will prevent the creation and ignition of dangerous explosive atmospheres. Zone subdivisions for the areas subject to explosion hazards have been made in close association with VDE 0165, forming a basis for the assessment of the scope of protective measures.

Information is also given for the sector of gas measurement systems and gas pressure regulation systems in a comprehensive set of examples about the explosion protection guidelines. This information shows which measures are sufficient to prevent the relevant risks.

Under Item No. 1.3.4 Gas pressure regulation systems
Item No. 1.3.5 Gas measurement systems

clear reference is made to the DVGW Worksheets G490, G491, G492/I (in preparation), G492/II and G495.

When observing these rules, explosion protective measures are required with

1. Gas pressure regulation systems in areas with over 4 bar operating pressure (input pressure) in the complete area to Zone 2

and

2. Gas measurement systems in areas with over 4 bar operating pressure in the complete area to Zone 2

Zone 2 includes areas in which it can be expected that hazardous explosive atmospheres due to gases, vapours or mists only occasionally and then only briefly occur.

Appendix to the Manufacturer's Declaration for Elster AS-200 Readout Device

Page 2 of 2

2. Scope of validity

This certificate is valid exclusively for AS-200 devices.

3. Use of the AS-200 Readout Device in Zone 2

- Replacing or removing the batteries within Zone 2 is not permitted.
- Plugging/unplugging operations must only be carried out with the readout device switched off.
- The connector must be screwed on the AS-200 and on the connected terminal device (e.g. DS-100 Data Storage Device, EK-8x System Volume Corrector or TC-90/T Temperature-Volume Corrector).

Elster Produktion GmbH, Mainz-Kastel, March 1997

B EC Declaration of Conformance (Translation)**EC Declaration of Conformance**

according to the "Law on the electromagnetic compatibility of equipment (EMCL)" and the EMC Guideline 89/336 of the Council of 3rd May 1989 (EMC Guideline).

The ELSTER Readout Device


Type AS-200

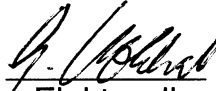
fulfils the EMC requirements according to

DIN EN 50 082 Part 1

and

DIN EN 55 022 and DIN VDE 0878 Part 3


- Elektronik -
- Systeme -
O. Pfaff


- Elektronik -
- Systeme -
G. Wohlrab

Mainz-Kastel, 26th March 1997

ELSTER 

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C Technical data of AS-200

Power supply

Rechargeable battery	4 x 1.2 Volt; 500 - 750 mAh Order no.: 04270018
Version	Mignon IEC Type R6 ANSI Type AA
or alternative: Battery	4 x 1.5 Volt
Operating time	approx. 8 h with fully charged batteries (600mAh)
Backup battery	1 x CR 1/2 AA; 950 mAh Order no.: 04270032

Connections (RS-232 interface)

Submin. D-SUB connector 15 pole	RS 232C / V.24
Configuration	4800 Bd, 8 bits, no parity, 1 stop bit.

Mechanical details

Dimensions (W x L x H)	approx. 115 x 230 x 60/40 mm
Weight with batteries	approx. 0.7 kg
IP class of protection:	IP 54 (without RS-232 socket)
Approvals	Ex Zone 2 (see Manufact. Declaration) CE label.
Ambient conditions	-10...+50 °C

D Technical data of LD-200

Power supply

Mains voltage	230 VAC \pm 10%, 50 Hz,
Current consumption	80 mA, 14.5 W
Insulation, mains/output voltage	4.5 Hz, 50 Hz, 1 s
Connectable batteries	2...6 x NiCd cells 1.2 Volt; 500 - 750 mAh Version: Mignon
Charging current	
(power charging, LED cont. lit)	800 mA; max. 10.5 V at least 2 min
(trickle charging, flashing LED)	15 mA (4.5Hz), max. 10.5 V
Charging method	- δ U method with charge control

Connection to AS-200

Connection to AS-200	D-SUB connector 15 pole
Lead length	approx. 2.5 m



Only suitable for connection to AS-200. Connection to AS-100 may cause damage to the readout device due to overvoltage.

Dimensions (W x L x H)	approx. 96 x 63 x 96/48.5 mm
IP class of protection	IP 20
Approvals	Various approvals (see housing) CE label
Ambient conditions	0...+40 ° C



Only suitable for use in dry areas. Provide adequate ventilation.